

# STAFF REPORT

## Rezoning #20CZ14 Hackney PUD

March 23, 2021 Town Council Meeting



**\*\* Since the Town Council Agenda went out, the applicant has provided additional conditions and those changes are shown in bold text.**

All property owners and neighborhood associations within 300 feet of this rezoning have been notified per UDO Sec. 2.2.11 *Public Notification*.

### **BACKGROUND INFORMATION:**

**Location:** 0, 2500, & 2600 Olive Chapel Road

**Applicant/Agent:** Brendie Vega, WithersRavenel

**Owners:** Charles & Judy Hackney and Edwin Goodwin

### **PROJECT DESCRIPTION:**

**Acreage:** ±79.79 acres

**PINs:** 0721492629, 0722406699, & 0722411102

**Current Zoning:** Rural Residential (RR) & R-80W

**Proposed Zoning:** Planned Unit Development-Conditional Zoning (PUD-CZ)

**2045 Land Use Map Designation:** Medium Density Residential

**Town Limits:** ETJ and Outside (annexation of portion in Wake County is required with rezoning)

### **Adjacent Zoning & Land Uses:**

|               | <b>Zoning</b>  | <b>Land Use</b>  |
|---------------|--|--|
| <b>North:</b> | Planned Unit Development-Conditional Zoning(PUD-CZ #17CZ21& #16CZ26)   | Single Family Residential (Sweetwater and Linden subdivisions)                             |
| <b>South:</b> | Rural Residential (RR); Medium Density Residential-Conditional Zoning (MD-CZ #13CZ26 & #13CZ08); Wake Co. R-80W              | Olive Chapel Road;<br>Single Family Residential (Riley's Pond and large lot single-family) |
| <b>East:</b>  | Rural Residential (RR); Planned Unit Development-Conditional Zoning (PUD-CZ #16CZ26)   | Single Family Residential (Linden subdivision and large lot single-family)                 |
| <b>West:</b>  | Planned Unit Development-Conditional Zoning (PUD-CZ #15CZ32) & Medium Density Residential-Conditional Zoning (MD-CZ #16CZ10) | Single Family Residential (Smith Farm and Haley Farm subdivisions)                         |

### **EXISTING CONDITIONS:**

The site consist of three (3) parcels on the north side of Olive Chapel Road totaling ±79.79 acres. The site has one single family residence, several sheds/barns, and two existing ponds. Along the north boundary there is a 100' stream buffer from Reedy Branch.

### **NEIGHBORHOOD MEETING:**

The applicant conducted a neighborhood meeting on October 29, 2020. The neighborhood meeting report is attached.



### **WCPSS Coordination:**

A Letter of Impact from Wake County Public School System (WCPSS) was received for this rezoning and is included in the staff report packet. WCPSS indicates that elementary and high schools within the current assignment area for this rezoning/development are anticipated to have insufficient capacity for future students; transportation to schools outside of the current assignment area should be anticipated. School expansion or construction within the next five years may address concerns at the high school level. Possible long-term solutions may include capping students out to schools with available seats (not very proximate), reassignments, or calendar changes.

### **2045 LAND USE MAP:**

The 2045 Land Use Map designates the properties as Medium Density Residential. The proposed PUD is consistent with the Land Use Map designation.

### **PLANNED UNIT DEVELOPMENT PLAN:**

The applicant is proposing a Planned Unit Development Plan with uses and development standards as follows:

#### **Permitted Uses:**

The Rezoned Lands may be used for, and only for, the uses listed immediately below. The permitted uses are subject to the limitations and regulations stated in the UDO and any additional limitations or regulations stated below. For convenience, some relevant sections of the UDO may be referenced; such references do not imply that other sections of the UDO do not apply.

#### Residential:

- Single Family
- Accessory Dwelling Unit
- Townhouse

#### Non-Residential:

- Utility, minor
- Greenway
- Park, active
- Park, passive

### **Proposed Design Controls:**

**Maximum Density: 3.5 units per acre\***

**\*The residential density will be a maximum of 3.5 dwelling units per acre this is a change from 4 units per acre.**

**Maximum Building Height: 50 feet**

**Maximum Built-Upon Area: 70%**



**Setbacks**

|  |             | <b>Proposed PUD-CZ minimum setbacks</b>                | <b>MD zoning district minimum setbacks</b> |
|--|-------------|--|--|
| Single-family                                | Front       | 5' from façade<br>20' from garage to back of sidewalk  | 25'  |
|  | Side        | 5'   | 6' min/16' total                           |
|  | Rear        | 10'  | 20'  |
|  | Corner side | 8'   | 15'  |
| <b>HDSF zoning district minimum setbacks</b> |             |  |  |
| Townhouse, front loaded                      | Front       | 10' from façade<br>20' from garage to back of sidewalk | 15'  |
|  | Side        | 5'   | 0' (8' between buildings)                  |
|  | Rear        | 10'  | 15'  |
|  | Corner side | 10'  | 15'  |
| <b>HDSF zoning district minimum setbacks</b> |             |  |  |
| Townhouse, alley loaded                      | Front       | 10' from front facade                                  | 15'  |
|  | Side        | 5'   | 0' (8' between buildings)                  |
|  | Rear        | 5'   | 15'  |
|  | Corner side | 10'  | 15'  |

**Buffers**

The proposed PUD meets or exceeds the buffers required by the UDO.

| <b>Perimeter Buffers:</b>  | <b>UDO Required</b> | <b>Proposed</b>                             |
|----------------------------|---------------------|---|
| Northern property boundary | 15' Type A          | <del>100'</del> <b>200' stream buffer**</b> |
| Eastern property boundary  | 20' Type B          | 20' Type A                                  |
| Western property boundary  | 15' Type A          | 20' Type A                                  |
| Olive Chapel Road          | 30' Type B          | 30' Type E*                                 |

\*A 30' Type B buffer shall be provided if homes along Olive Chapel Road are not alley-loaded.

**\*\* In addition to the 100' riparian buffer to the north, an additional 100' buffer will be established. This additional 100' may include utilities, trails and other active or passive recreation.**

**Architectural Standards**

The proposed development offers the following architectural controls to ensure a consistency of character throughout the development, while allowing for enough variety to create interest and avoid monotony. Changes to the exterior materials, roof, windows, doors, process, trim, etc. are



allowable with administrative approval at the staff level. Further details shall be provided at the time of Residential Master Subdivision Plan submittal. The following conditions shall apply:

1. Vinyl siding is not permitted; however, vinyl windows, decorative elements and trim are permitted.
2. The roofline cannot be a single mass; it must be broken up horizontally and vertically between every unit.
3. Garage doors must have windows, decorative details or carriage-style adornments on them.
4. The rear and side elevations of the units that can be seen from the right-of-way shall have trim around the windows.
5. The visible side of a townhome on a corner lot facing the public street shall contain at least 2 decorative elements such as, but not limited to, the following elements:
  - Windows
  - Bay window
  - Recessed window
  - Decorative window
  - Trim around the windows
  - Wrap-around porch or side porch
  - Two or more building materials
  - Column
  - Portico
  - Balcony
  - Dormer
  - Decorative brick/stone
  - Decorative trim
  - Decorative shake
  - Decorative air vents on gable
  - Decorative gable
  - Decorative cornice
6. The garage cannot protrude more than 1-foot from either the front façade or porch.

### Resource Conservation Area

The Hackney PUD is south and west of NC 540 and is therefore required to provide 30% of the gross site as RCA. If the single-family portion of the PUD is mass graded, that portion of the project will be required to provide an additional 5% RCA. They propose to meet these requirements.

### Tree Replanting

Existing deciduous trees greater than 18" in diameter (DBH), as identified in the tree survey, that are removed by site development shall be replaced by planting a 1.5" caliper native tree from the *Town of Apex Design and Development Manual* as a street tree or as other required landscaping. Excess required tree replacement will occur in common open space areas.

### Clean Energy

Residential dwelling units will be provided with solar conduit to accommodate the future installation of solar panels.

### Water Quality

1. Signs will be installed near SCMs in order to:
  - Reduce pet water near SCM drainage areas
  - Reduce fertilizer near SCM drainage areas
2. Installation of Pet Waste Stations in common areas will occur within the neighborhood





**Planting and Landscaping**

1. Install Warm Season grasses (Bermuda, Zoysia, etc) in lawn areas to reduce the need for irrigation and chemicals.
2. Install required Street Trees, Buffer, and Re-Vegetation plantings that consist of a variety of native plant materials recognized by the New Hope Audubon Society or the NCSU manual for Landscaping for Wildlife with Native Plants as being bird and pollinator friendly; as allowed by the Town of Apex Deign & Development Manual or approved by Apex staff.
3. Specify pocket park plantings that are recognized by the NC Wildlife Federation as being Native Pollinator Plants as part of the Statewide Butterfly Highway initiative.
4. Include at least 4 hardwood tree varieties in the proposed plantings, as allowed by the Apex Design and Development Manual.

**Environmental Resources**

**Parking**

Parking and loading will comply with all applicable requirements of UDO Sec. 8.3 *Parking and Loading*. Per UDO Section 8.3.4 of the UDO, guest parking shall be designated within common areas and be distributed throughout the project. Striped on-street parking may be counted toward guest parking requirements. For townhouses, guest parking shall be distributed so that there is at least one parking space within 200' of each townhouse lot.

**Public Facilities**

The project's construction will consist of the extension of public facilities to serve the site. All public facilities and infrastructure shall comply with the Town of Apex Sewer and Water Master Plans and the Town of Apex Standards and Specifications. Public facilities include:

Water/Sanitary Sewer:

All lines will be designed according to Town of Apex Standards and Specifications.

Other Utilities:

Electric service shall be provided by the Town of Apex. Gas, telephone, and cable shall be provided by the builder as coordinated with the appropriate utility companies.

**Stormwater Management**

Two ponds exist on the parcels and drain to Reedy Branch Creek, eventually feeding into Jordan Lake. The proposed development plan will require stormwater management measures in accordance with Sections 6.1 and 7.5.7 in the Town of Apex Unified Development Ordinance. Stormwater captured on the site will be conveyed to proposed Stormwater Control Measures, which will be identified on plans during the major subdivision or site plan approval stage. Post-development peak runoff shall not exceed pre-development peak runoff for the 24-hour, 1-year and 10-year storm events in accordance with the Unified Development Ordinance. Treatment for the first 1-inch of runoff will be provided such that the removal of 85% Total Suspended Solids is achieved. All stormwater devices will meet the design requirements of NCDENR and the Town of Apex.



**APEX TRANSPORTATION PLAN/ACCESS and CIRCULATION:**

The Site will require an internal public roadway network and parking spaces. The onsite transportation circulation system shall be consistent with the Town of Apex Transportation Plan and the Town of Apex Standard Specifications and Standard Details. The following conditions shall apply:

1. Hasse Avenue will be constructed between Olive Chapel Road and its current terminus north of the project.
2. Olive Chapel Road will be widened to include construction of a 100-foot eastbound left-turn lane with appropriate deceleration length and taper and a 100-foot westbound right-turn lane with appropriate deceleration length and taper on Olive Chapel Road, subject to NCDOT review and approval.
3. The Olive Chapel Road turn lane widening will be completed prior to platting Hasse Avenue access to Olive Chapel Road and the connection to Hasse Avenue north of the project will be completed prior to the last plat in the subdivision.
4. A 6-foot bike lane and 5-foot paved shoulder will be located on the north side of Olive Chapel Road per the Bicycle and Pedestrian System Plan Map.
5. **Alleys may be proposed to vary from Town standards in order to accommodate water and sewer utilities, provided they maintain the same or greater width of pavement and right of way, subject to staff review and approval at the time of subdivision and construction plans.**
6. **There will be no private driveways permitted along Olive Chapel Road.**

**Pedestrian Facilities**

1. The development plan will incorporate sidewalk infrastructure along Olive Chapel Road as well as the internal street network.
2. A trail will serve as a connection from the western portion of the community to the Reedy Branch Greenway.
3. Sidewalks will be provided on both sides of all streets for single-family detached homes.
4. There will be a 10-foot side path provided along minor collector road as shown on the Bicycle and Pedestrian Systems Plan Map.
5. **Prior platting the 75<sup>th</sup> lot in the neighborhood, the Developer will extend a 5' sidewalk approximately 860 feet along the north side of Olive Chapel to western limits of the Linden Subdivision. Developer will attempt to obtain the required right-of-way and/or easements for construction of this sidewalk from the adjacent property owners. If the required right-of-way and/or easements cannot be obtained by that time, a Fee-in-Lieu in the amount of 125% of the estimated cost of construction plus fair market value of the property to be acquired, shall be assessed. Any performance guarantee provided for this section of sidewalk shall be released upon acceptance of said fee-in-lieu by the Town.**

**Affordable Housing**

If the Town of Apex has a fund or other mechanism in place to receive donations to construct, subsidize, or participate in the development of affordable housing units (the "Fund"), the developer will contribute \$215 per lot to this Fund prior to the first residential Certificate of Occupancy. In the event the Fund has not been established by the Town of Apex, the money will be conveyed to a local non-profit working on affordable housing initiatives. The developer will work with the Town of Apex to identify a mutually acceptable local non-profit organization to receive these funds.

## STAFF REPORT

### Rezoning #20CZ14 Hackney PUD

March 23, 2021 Town Council Meeting



#### **ENVIRONMENTAL ADVISORY BOARD:**

This rezoning was submitted before the Environmental Advisory Board began holding pre-application meetings on rezonings.

#### **PARKS, RECREATION, AND CULTURAL RESOURCES ADVISORY COMMISSION:**

The Parks, Recreation, and Cultural Resources Advisory Commission reviewed this item at their December 9, 2020 meeting and unanimously recommended a fee-in-lieu of dedication with credit for construction of greenway which connects side path along Hasse Ave to the west connecting to the Reedy Branch Greenway in Smith Farm. The fee rate will be set at the time of Town Council approval and the credit of construction will be calculated prior to construction plan approval. Per UDO Article 14, the greenway must be completed and accepted prior to 25% of the building permits for the project being issued.

#### **PLANNING BOARD RECOMMENDATION:**

The Planning Board held a Public Hearing on March 8, 2021 and voted to recommend approval, with the conditions as offered by the applicant, by a vote of 6-0.

#### **PLANNING STAFF RECOMMENDATION:**

Planning staff recommends approval of rezoning #20CZ14 Hackney PUD with the conditions as proposed by the applicant.

#### **ANALYSIS STATEMENT OF THE REASONABLENESS OF THE PROPOSED REZONING:**

This Statement will address consistency with the Town's comprehensive and other applicable plans, reasonableness, and effect on public interest:

The 2045 Land Use Map designates the site as Medium Density Residential. The proposed PUD is consistent with that land use classification.

Approval of the rezoning is reasonable and in the public interest because the site will act a transition between higher and lower residential densities. The proposed rezoning also provides for increased stream buffers, higher planting standards, and a contribution to affordable housing.

The proposed rezoning is also reasonable and in the public interest because it will allow this property to develop in a way that is consistent with the surrounding areas and will build side path along the minor collector that will be constructed through the site to Olive Chapel Road.

#### **PLANNED UNIT DEVELOPMENT DISTRICT AND CONDITIONAL ZONING STANDARDS:**

##### ***Standards***

In return for greater flexibility in site design requirements, Planned Development (PD) Districts are expected to deliver exceptional quality community designs that preserve critical environmental resources; provide high quality community amenities; incorporate creative design in the layout of buildings, Resource Conservation Area and circulation; ensure compatibility with surrounding land uses and neighborhood character; provide high quality architecture; and provide greater efficiency in the layout and provision of roads, utilities, and other infrastructure. The Planned Development (PD) Districts shall not be used as a means of circumventing the Town's adopted land development regulations for routine developments.



1) *Planned Unit Development (PUD-CZ) District*

In approving a Planned Development (PD) Zoning District designation for a PUD-CZ, the Town Council shall find the PUD-CZ district designation and PD Plan for PUD-CZ demonstrates compliance with the following standards:

a) *Development parameters*

- (i) The uses proposed to be developed in the PD Plan for PUD-CZ are those uses permitted in Sec. 4.2.2 *Use Table*.
- (ii) The uses proposed in the PD Plan for PUD-CZ can be entirely residential, entirely non-residential, or a mix of residential and non-residential uses, provided a minimum percentage of non-residential land area is included in certain mixed use areas as specified on the 2030 Land Use Map. The location of uses proposed by the PUD-CZ must be shown in the PD Plan with a maximum density for each type of residential use and a maximum square footage for each type of non-residential use.
- (iii) The dimensional standards in Sec. 5.1.3 *Table of Intensity and Dimensional Standards, Planned Development Districts* may be varied in the PD Plan for PUD-CZ. The PUD-CZ shall demonstrate compliance with all other dimensional standards of the UDO, North Carolina Building Code, and North Carolina Fire Code.
- (iv) The development proposed in the PD Plan for PUD-CZ encourages cluster and compact development to the greatest extent possible that is interrelated and linked by pedestrian ways, bikeways and other transportation systems. At a minimum, the PD Plan must show sidewalk improvements as required by the Apex Transportation Plan and the *Town of Apex Standard Specifications and Standard Details*, and greenway improvements as required by the Town of Apex Parks, Recreation, Greenways, and Open Space Plan and the Apex Transportation Plan. In addition, sidewalks shall be provided on both sides of all streets for single-family detached homes.
- v) The design of development in the PD Plan for PUD-CZ results in land use patterns that promote and expand opportunities for walkability, connectivity, public transportation, and an efficient compact network of streets. Cul-de-sacs shall be avoided unless the design of the subdivision and the existing or proposed street system in the surrounding area indicate that a through street is not essential in the location of the proposed cul-de-sac, or where sensitive environmental areas such as streams, floodplains, and wetlands would be substantially disturbed by making road connections.
- (vi) The development proposed in the PD Plan for PUD-CZ is compatible with the character of surrounding land uses and maintains and enhances the value of surrounding properties.
- (vii) The development proposed in the PD Plan for PUD-CZ has architectural and design standards that are exceptional and provide higher quality than routine developments. All residential uses proposed in a PD Plan for PUD-CZ shall provide architectural elevations representative of the residential structures to be built to ensure the Standards of this Section are met.



- b) *Off-street parking and loading.* The PD Plan for PUD-CZ shall demonstrate compliance with the standards of Sec. 8.3 *Off-Street Parking and Loading*, except that variations from these standards may be permitted if a comprehensive parking and loading plan for the PUD-CZ is submitted as part of the PD Plan that is determined to be suitable for the PUD-CZ, and generally consistent with the intent and purpose of the off-street parking and loading standards.
- c) *RCA.* The PD Plan for PUD-CZ shall demonstrate compliance with Sec. 8.1.2 Resource Conservation Area, except that the percentage of RCA required under Sec. 8.1.2 may be reduced by the Town Council by no more than ten percent (10%) provided that the PD Plan for PUD-CZ includes one or more of the following:
- (i) A non-residential component; or
  - (ii) An overall density of 7 residential units per acre or more; or
  - (iii) Environmental measures including but not limited to the following:
    - (a) The installation of a solar photovoltaic (PV) system on a certain number or percentage of single-family or townhouse lots or on a certain number or percentage of multifamily, mixed-use, or nonresidential buildings. All required solar installation shall be completed or under construction prior to 90% of the building permits being issued for the approved number of lots or buildings. For single-family or townhouse installations, the lots on which these homes are located shall be identified on the Master Subdivision Plat, which may be amended;
    - (b) The installation of a geothermal system for a certain number or percentage of units within the development; or
    - (c) Energy efficiency standards that exceed minimum Building Code requirements (i.e. SEER rating for HVAC).
- d) *Landscaping.* The PD Plan for PUD-CZ shall demonstrate compliance with the standards of Sec. 8.2 *Landscaping, Buffering and Screening*, except that variations from these standards may be permitted where it is demonstrated that the proposed landscaping sufficiently buffers uses from each other, ensures compatibility with land uses on surrounding properties, creates attractive streetscapes and parking areas and is consistent with the character of the area. In no case shall a buffer be less than one half of the width required by Sec. 8.2 or 10 feet in width, whichever is greater.
- e) *Signs.* Signage in the PD Plan for PUD-CZ shall demonstrate compliance with Sec. 8.7 *Signs*, except that the standards can be varied if a master signage plan is submitted for review and approval concurrent with the PD plan and is determined by the Town Council to be suitable for the PUD-CZ and generally consistent with the intent and purpose of the sign standards of the UDO. The master signage plan shall have design standards that are exceptional and provide for higher quality signs than those in routine developments and shall comply with Sec. 8.7.2 *Prohibited Signs*.



- f) *Public facilities.* The improvements standards and guarantees applicable to the public facilities that will serve the site shall comply with Article 7: *Subdivision* and Article 14: *Parks, Recreation, Greenways, and Open Space*.
- (i) The PD Plan for PUD-CZ demonstrates a safe and adequate on-site transportation circulation system. The on-site transportation circulation system shall be integrated with the off-site transportation circulation system of the Town. The PD Plan for PUD-CZ shall be consistent with the Apex Transportation Plan and the *Town of Apex Standard Specifications and Standard Details* and show required right-of-way widths and road sections. A Traffic Impact Analysis (TIA) shall be required per Sec. 13.19.
- (ii) The PD Plan for PUD-CZ demonstrates a safe and adequate on-site system of potable water and wastewater lines that can accommodate the proposed development, and are efficiently integrated into off-site potable water and wastewater public improvement plans. The PD Plan shall include a proposed water and wastewater plan.
- (iii) Adequate off-site facilities for potable water supply, sewage disposal, solid waste disposal, electrical supply, fire protection and roads shall be planned and programmed for the development proposed in the PD Plan for PUD-CZ, and the development is conveniently located in relation to schools and police protection services.
- (iv) The PD Plan shall demonstrate compliance with the parks and recreation requirements of Sec. Article 14: *Parks, Recreation, Greenways, and Open Space* and Sec. 7.3.1 *Privately-owned Play Lawns* if there is a residential component in the PUD-CZ.
- g) *Natural resource and environmental protection.* The PD Plan for PUD-CZ demonstrates compliance with the current regulatory standards of this Ordinance related to natural resource and environmental protection in Sec. 6.1 *Watershed Protection Overlay District*, Sec. 6.2 *Flood Damage Prevention Overlay District*, and Sec. 8.1 *Resource Conservation*.
- h) *Storm water management.* The PD Plan shall demonstrate that the post-development rate of on-site storm water discharge from the entire site shall not exceed pre-development levels in accordance with Sec. 6.1.7 of the UDO.
- i) *Phasing.* The PD Plan for PUD-CZ shall include a phasing plan for the development. If development of the PUD-CZ is proposed to occur in more than one phase, then guarantees shall be provided that project improvements and amenities that are necessary and desirable for residents of the project, or that are of benefit to the Town, are constructed with the first phase of the project, or, if this is not possible, then as early in the project as is technically feasible.
- j) *Consistency with 2045 Land Use Map.* The PD Plan for PUD-CZ demonstrates consistency with the goals and policies established in the Town's 2030 Land Use.
- k) *Complies with the UDO.* The PD Plan for PUD-CZ demonstrates compliance with all other relevant portions of the UDO.



**Legislative Considerations**

The Town Council shall find the PUD-CZ designation demonstrates compliance with the following standards. Sec. 2.3.3.F:

The applicant shall propose site-specific standards and conditions that take into account the following considerations, which are considerations that are relevant to the legislative determination of whether or not the proposed conditional zoning district rezoning request is in the public interest. These considerations do not exclude the legislative consideration of any other factor that is relevant to the public interest.

- 1) *Consistency with 2030 Land Use Map.* The proposed Conditional Zoning (CZ) District use's appropriateness for its proposed location and consistency with the purposes, goals, objectives, and policies of the 2030 Land Use Map.
- 2) *Compatibility.* The proposed Conditional Zoning (CZ) District use's appropriateness for its proposed location and compatibility with the character of surrounding land uses.
- 3) *Zoning district supplemental standards.* The proposed Conditional Zoning (CZ) District use's compliance with Sec. 4.4 *Supplemental Standards*, if applicable.
- 4) *Design minimizes adverse impact.* The design of the proposed Conditional Zoning (CZ) District use's minimization of adverse effects, including visual impact of the proposed use on adjacent lands; and avoidance of significant adverse impacts on surrounding lands regarding trash, traffic, service delivery, parking and loading, odors, noise, glare, and vibration and not create a nuisance.
- 5) *Design minimizes environmental impact.* The proposed Conditional Zoning District use's minimization of environmental impacts and protection from significant deterioration of water and air resources, wildlife habitat, scenic resources, and other natural resources.
- 6) *Impact on public facilities.* The proposed Conditional Zoning (CZ) District use's avoidance of having adverse impacts on public facilities and services, including roads, potable water and wastewater facilities, parks, schools, police, fire and EMS facilities.
- 7) *Health, safety, and welfare.* The proposed Conditional Zoning (CZ) District use's effect on the health, safety, or welfare of the residents of the Town or its ETJ.
- 8) *Detrimental to adjacent properties.* Whether the proposed Conditional Zoning (CZ) District use is substantially detrimental to adjacent properties.
- 9) *Not constitute nuisance or hazard.* Whether the proposed Conditional Zoning (CZ) District use constitutes a nuisance or hazard due to traffic impact or noise, or because of the number of persons who will be using the Conditional Zoning (CZ) District use.
- 10) *Other relevant standards of this Ordinance.* Whether the proposed Conditional Zoning (CZ) District use complies with all standards imposed on it by all other applicable provisions of this Ordinance for use, layout, and general development characteristics.



January 25, 2021

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Subject: **Staff summary and comments for the Hackney Tract Subdivision TIA,  
12/22/2020**

Dr. Wan:

Please review the following summary of my comments and recommendations. You may schedule a meeting with me and your client to discuss at your convenience.

#### Study Area

The TIA studied access to the proposed subdivision development at the following intersection:

- Access #1/Hasse Avenue Extension and Olive Chapel Road

The following four intersections were also studied in the TIA:

- Olive Chapel Road and Richardson Road
- Olive Chapel Road and Apex Barbecue Road
- Richardson Road and Hasse Avenue/Little Gem Lane
- US Highway 64 East at Richardson Road
- US Highway 64 West at U-turn east of Richardson Road

#### Trip Generation

The proposed development is expected to consist of up to 100 single-family homes and 133 multi-family homes. It's projected to generate approximately 33 new trips entering and 106 new trips exiting the site during the weekday A.M. peak hour and 112 new trips entering and 66 new trips exiting the site during the weekday P.M. peak hour. The development is projected to add an additional 2,005 daily trips onto the adjacent roadway network.

**TOWN OF APEX**

*The Peak of Good Living*

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## Background traffic

Background traffic consists of 3% annual background traffic growth compounded to build out year 2024, and the following approved developments:

- Saddlebrook - 25% traffic (75% build out)
- Buckhorn Preserve – 50% traffic (50% build out)
- Stillwater -15% traffic (85% build out)
- Westford – 20% traffic (80% build out)
- Smith Farm Residential– 25% traffic (75% build out)
- Linden – 85% traffic (15% build out)
- Sweetwater residential - 20% traffic (80% build out)
- Sweetwater commercial

## Trip Distribution and Assignment

The trip distributions to and from the development site are as follows:

- 50% to/from the east via US Highway 64
- 10% to/from the west via US Highway 64
- 25% to/from the east via Olive Chapel Road
- 5% to/from the west via Olive Chapel Road
- 8% to/from the south via Richardson Road
- 2% to/from the south via Apex Barbecue Road

## Traffic Capacity Analysis and Recommendations

Level of Service (LOS) is a grade of A through F assigned to an intersection, approach, or movement to describe how well or how poorly it operates. LOS A through D is considered acceptable for peak hour operation. LOS E or F describes potentially unacceptable operation and developers may be required to mitigate their anticipated traffic impact to improve LOS based on the Apex Unified Development Ordinance (UDO).

Tables 1 through 8 describe the levels of service (LOS) for the scenarios analyzed in the TIA. “NA” is shown when the scenario does not apply. The scenarios are as follows:

- **Existing 2020** - Existing year 2020 traffic.
- **No Build 2024** – Projected year (2024) with background growth, approved development traffic from others, and committed transportation improvements by others where applicable.
- **Build 2024** – Projected year (2024) with background traffic, background improvements, and site build-out including recommended improvements where applicable.

**Access #1/Hasse Avenue Extension and Olive Chapel Road (Unsignalized)**

| <b>Table 1. A.M. / P.M. Unsignalized Peak Hour Levels of Service<br/>Access #1/Hasse Avenue Extension and Olive Chapel Road</b> |                          |
|---|--------------------------|
|   | <b>Build 2024</b>        |
| <b><u>Overall</u></b>   | <u>NA</u>                |
| <b><i>Eastbound (Olive Chapel Road)</i></b>   | <i>A / A<sup>2</sup></i> |
| <b><i>Westbound (Olive Chapel Road)</i></b>   | <i>NA</i>                |
| <b><i>Southbound (Access #1/Hasse Avenue Extension)</i></b>   | <i>C / D<sup>1</sup></i> |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends construction of Future Access #1/Hasse Avenue to consist of one inbound lane and one outbound lane. The TIA also recommends construction of a dedicated left-turn lane on eastbound Olive Chapel Road with 100 feet of storage length and appropriate taper, and a dedicated right-turn lane on westbound Olive Chapel Road with 100 feet of storage length and appropriate taper.

Apex staff recommendations:

- Apex staff concur with the recommendations. The stop-controlled southbound approach is projected to operate at LOS D or better with delays of 16 and 25 seconds per vehicle in the AM and PM peak hours. The turn lanes proposed on Olive Chapel Road are projected to provide enough capacity to store queues into the development during both peak hours.

**Olive Chapel Road and Richardson Road**

| <b>Table 2. A.M. / P.M. Peak Hour Levels of Service<br/>Olive Chapel Road and Richardson Road</b> |                          |                          |                   |
|---|--------------------------|--------------------------|-------------------|
|   | <b>Unsignalized</b>      | <b>Signalized</b>        |                   |
|   | <b>Existing<br/>2020</b> | <b>No Build<br/>2024</b> | <b>Build 2024</b> |
| <b><u>Overall</u></b>   | <u>NA</u>                | <u>A / A</u>             | <u>A / A</u>      |
| <b><i>Eastbound (Olive Chapel Road)</i></b>   | <i>B / B<sup>2</sup></i> | <i>A / B</i>             | <i>A / B</i>      |
| <b><i>Westbound (Olive Chapel Road)</i></b>   | <i>B / B<sup>2</sup></i> | <i>B / B</i>             | <i>B / B</i>      |
| <b><i>Northbound (Richardson Road)</i></b>  | <i>B / B<sup>1</sup></i> | <i>B / B</i>             | <i>B / B</i>      |
| <b><i>Southbound (Richardson Road)</i></b>  | <i>B / C<sup>1</sup></i> | <i>A / B</i>             | <i>A / B</i>      |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends no improvements at this intersection.

Apex staff recommendations:

- Apex staff concur with the recommendations in the TIA. When signalized, this intersection is projected to operate at LOS A in both peak hours in the Build 2024 scenario. A traffic signal has been approved by NCDOT at this intersection, and is committed by adjacent development for installation prior to the build out of this development.

**Olive Chapel Road and Apex Barbecue Road (Unsignalized)**

| <b>Table 3. A.M. / P.M. Unsignalized Peak Hour Levels of Service<br/>Olive Chapel Road and Apex Barbecue Road</b> |                          |                          |                    |
|---|--------------------------|--------------------------|--------------------|
|   | <b>Existing<br/>2020</b> | <b>No Build<br/>2024</b> | <b>Build 2024</b>  |
| <b><u>Overall</u></b>   | <u>NA</u>                | <u>NA</u>                | <u>NA</u>          |
| <b><i>Eastbound (Olive Chapel Road)</i></b>   | NA                       | NA                       | NA                 |
| <b><i>Westbound (Olive Chapel Road)</i></b>   | A / A <sup>2</sup>       | A / B <sup>2</sup>       | A / B <sup>2</sup> |
| <b><i>Northbound (Apex Barbecue Road)</i></b>   | B / C <sup>1</sup>       | C / F <sup>1</sup>       | C / F <sup>1</sup> |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends no improvements at this intersection.

Apex staff recommendations:

- Apex staff concur with the recommendations in the TIA. The stop-controlled northbound approach is projected to operate at LOS F in the PM peak hour with delays of 135 seconds per vehicle and 95<sup>th</sup> percentile queues of 250 feet. However the development is not anticipated to add more than 3% to the overall intersection traffic volume, therefore no improvements are recommended per the UDO. This intersection is identified for future realignment in the Town’s Transportation Plan, but no funded project is identified at this time and both roadways are state-maintained.

**Richardson Road and Hasse Avenue/Little Gem Lane (Unsignalized)**

| <b>Table 4. A.M. / P.M. Unsignalized Peak Hour Levels of Service<br/>Richardson Road and Hasse Avenue/Little Gem Lane</b> |                          |                          |                    |
|---|--------------------------|--------------------------|--------------------|
|   | <b>Existing<br/>2020</b> | <b>No Build<br/>2024</b> | <b>Build 2024</b>  |
| <b><u>Overall</u></b>   | <u>NA</u>                | <u>NA</u>                | <u>NA</u>          |
| <b><i>Eastbound (Little Gem Lane)</i></b>   | A / B <sup>1</sup>       | C / C <sup>1</sup>       | C / D <sup>1</sup> |
| <b><i>Westbound (Hasse Avenue)</i></b>  | A / A <sup>1</sup>       | C / C <sup>1</sup>       | C / C <sup>1</sup> |
| <b><i>Northbound (Richardson Road)</i></b>  | A / A <sup>2</sup>       | A / A <sup>2</sup>       | A / A <sup>2</sup> |
| <b><i>Southbound (Richardson Road)</i></b>  | A / A <sup>2</sup>       | A / A <sup>2</sup>       | A / B <sup>2</sup> |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends no improvements at this intersection.

Apex staff recommendations:

- Apex staff concur with the recommendations in the TIA. The minor street approaches are projected to operate at LOS D or better during both peak hours of operation, with 95<sup>th</sup> percentile queues not exceeding 50 feet on any approach.

**US Highway 64 East at Richardson Road**

| <b>Table 5. A.M. / P.M. Peak Hour Levels of Service<br/>US Highway 64 East at Richardson Road</b> |                          |                          |                   |
|---|--------------------------|--------------------------|-------------------|
|   | <b>Unsignalized</b>      | <b>Signalized</b>        |                   |
|   | <b>Existing<br/>2020</b> | <b>No Build<br/>2024</b> | <b>Build 2024</b> |
| <b><u>Overall</u></b>   | <u>NA</u>                | <u>C / D</u>             | <u>C / D</u>      |
| <b><i>Eastbound (US Hwy 64)</i></b>   | NA                       | C / D                    | C / E             |
| <b><i>Westbound Left (US Hwy 64)</i></b>  | F / F <sup>2</sup>       | B / B                    | A / B             |
| <b><i>Northbound Right (Richardson Road)</i></b>  | C / C <sup>1</sup>       | C / D                    | C / D             |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends no improvements at this intersection.

Apex staff recommendations:

- Apex staff concur with the recommendations in the TIA. When signalized with dual westbound left and dual northbound right turn lanes, this intersection is projected to operate at LOS C and D in the AM and PM peak hours of operation with average intersection delays of 22 seconds and 44.5 seconds per vehicle. The eastbound approach is projected to operate at LOS E in the PM peak hour. However, the development is not anticipated to add more than 4% to the overall intersection traffic volume, therefore no improvements are recommended per the UDO. A traffic signal has been approved by NCDOT at this intersection, and is committed by adjacent development along with the additional turn lanes for installation prior to the build out of this development.

**US Highway 64 West at U-turn east of Richardson Road**

| <b>Table 6. A.M. / P.M. Peak Hour Levels of Service<br/>US Highway 64 West at U-turn east of Richardson Road</b> |                          |                          |                   |
|--|--------------------------|--------------------------|-------------------|
|  | <b>Unsignalized</b>      | <b>Signalized</b>        |                   |
|  | <b>Existing<br/>2020</b> | <b>No Build<br/>2024</b> | <b>Build 2024</b> |
| <b><u>Overall</u></b>  | <u>NA</u>                | <u>B / C</u>             | <u>B / C</u>      |
| <b><i>Eastbound U-turn (US Hwy 64)</i></b>   | <i>B / C<sup>2</sup></i> | <i>C / E</i>             | <i>C / E</i>      |
| <b><i>Westbound (US Hwy 64)</i></b>  | <i>NA</i>                | <i>A / C</i>             | <i>B / C</i>      |

1. Level of service for stop-controlled minor street approaches.
2. Level of service for left turn or U-turn movements on free-flowing approaches.

TIA recommendations:

- The TIA recommends no improvements at this intersection.

Apex staff recommendations:

- Apex staff concur with the recommendations in the TIA. When signalized with dual eastbound U-turn lanes, this intersection is projected to operate at overall LOS C or better in both peak hours in the Build 2024 scenario. A traffic signal has been approved by NCDOT at this intersection, and is committed by adjacent development along with the additional U-turn lane for installation prior to the build out of this development.

Please coordinate with the NCDOT District Engineer’s Office concerning recommended improvements. Town staff will be available for meetings with NCDOT staff to discuss improvements on state maintained roadways as needed. All recommendations are subject to review by Town Council prior to approval.

Sincerely,



Serge Grebenschikov  
Traffic Engineer  
919-372-7448





**Rezoning #20CZ14**



# PLANNED UNIT DEVELOPMENT-CONDITIONAL ZONING DISTRICT PETITION 2045 LAND USE MAP AMENDMENT PROCESS INFORMATION



**PD PLAN/PUD-CZ PETITION SUBMISSION:** Applications are due by 12:00 pm on the first business day of each month. See the [PUD Plan Schedule](#) on the website for more details.

**PD PLAN/PUD-CZ PETITION FEES:**

PUD-CZ Request: \$1,500.00 + \$10 an acre  
 PD Plan Amendment not requiring full TRC Review: \$500.00  
 2045 Land Use Map Amendment: \$700.00

**PRE-APPLICATION MEETING:** A pre-application meeting with members of the Technical Review Committee is required to be scheduled prior to the submittal of a PD Plan for PUD-CZ. Pre-application meetings are typically scheduled on the 1<sup>st</sup>, 2<sup>nd</sup> and 5<sup>th</sup> Thursdays of the month.

To schedule a meeting, applicants must e-mail a pdf map, drawing, model, site or sketch plan to Planner Lauren Staudenmaier ([lauren.staudenmaier@apexnc.org](mailto:lauren.staudenmaier@apexnc.org)) no

later than five (5) working days prior to the desired meeting day.

**PURPOSE OF A PUD-CZ (UDO Section 3.3.3(C)):** The purpose of the PUD-CZ is to permit variations in order to allow flexibility for landowners to creatively plan for a site specific, higher quality overall development of their land in a way that is not possible through the strict application of the minimum standards of this Ordinance. This is done through the application of performance standards that: integrate and mix uses where a mix of uses is proposed, possess interconnectivity, reflect the small-town character of Apex, expand opportunities for public transportation, preserve of natural features, integrate resource conservation area into plan for development, and that public facilities are available.

**NEIGHBORHOOD MEETING:** Neighborhood meetings are required per UDO Section 2.2.7 prior to application submission. The applicant is required to notify property owners and any neighborhood association that represents citizens within that area within 300 feet of the subject property via first class mail a minimum of 10 days in advance of the neighborhood meeting. The applicant shall use their own return address on the envelopes as the meeting is a private meeting between the developer and the neighbors. The applicant shall submit the "Certified List of Property Owners" and "Neighborhood Meeting Packet" forms included in this application packet with their initial submittal. The Neighborhood Meeting Packet is located at the very end of this document.

**ANNEXATION REQUIREMENTS:** If a property or portion thereof subject to the PUD is outside the corporate limits and ETJ, an [annexation petition](#) is **REQUIRED** to be submitted on the same day as this application.

**Electronic Submittal Requirements (submit in IDT):** [Click here to access IDT Plans Website](#)

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• PUD-CZ Application</li> <li>• PD Plan Text (pdf &amp; Word versions)</li> <li>• Colored Rendering of Building Elevations – 11"x17"</li> <li>• Transportation Impact Analysis</li> </ul> | <ul style="list-style-type: none"> <li>• Site Plan Set</li> <li>• 24" x 36" size</li> <li>• Scale not less than: 1" = 50' horizontal, 1" = 5' vertical</li> <li>• Saved as pdf – no scanned plans</li> </ul> |
|--|--|

**Hard Copy Submittal Requirements: Submit to Planning Department**

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• PUD-CZ Petition Application</li> <li>• Petition Fee</li> <li>• One (1) hardcopy PD Plan Text</li> <li>• Three (3) bound Site Plan Sets – 24" x 36" size</li> <li>• Colored Rendering of Building Elevations</li> <li>• Legal Description (metes and bounds)</li> <li>• Certified List of Property Owners within 300 feet of subject property</li> <li>• Development Name Approval Application</li> <li>• Town of Apex Utilities Offer &amp; Agreement</li> <li>• Agent Authorization Form</li> <li>• WCPSS Residential Development Notice</li> <li>• Neighborhood Meeting Packet</li> <li>• If applicable: Annexation Petition, map, legal description and \$200.00 fee</li> <li>• Two (2) bound copies of the Transportation Impact Analysis and 1 copy of the TIA &amp; traffic analysis files</li> </ul> | <ul style="list-style-type: none"> <li>• on disk or FTP site at first submittal (if applicable)</li> <li>• One (1) set of envelopes addressed to Certified List of Property Owners within 300 feet of subject property and all the HOAs of those properties within 300' of the subject property. Planning staff may require an additional set of envelopes based on the timing of the Planning Board and Town Council meetings.</li> <li>• Addresses must be from a current list obtained from the Wake County GIS Map Services. A buffer report service is offered for \$1 per page. Please contact them at 919-856-6360 or <a href="http://www.wakegov.com/tax/Pages/default.aspx">http://www.wakegov.com/tax/Pages/default.aspx</a></li> <li>• Affixed with first class stamps &amp; the following return address:<br/>                     Town of Apex Planning Department<br/>                     P.O. Box 250<br/>                     Apex, NC 27502</li> </ul> |
|--|--|



## PETITION PROCESS INFORMATION

**NEIGHBORHOOD MEETING:** Neighborhood meetings are required per UDO Section 2.2.7 prior to application submission. The applicant is required to notify property owners and any neighborhood association that represents citizens within that area within 300 feet of the subject property via first class mail a minimum of 10 days in advance of the neighborhood meeting. The applicant shall use their own return address on the envelopes as the meeting is a private meeting between the developer and the neighbors. The applicant shall submit the “Certified List of Property Owners” and “Neighborhood Meeting Packet” forms included in this application packet with their initial submittal. The Neighborhood Meeting Packet is located at the very end of this document.

**REVIEW FOR SUFFICIENCY:** Incomplete plans will be returned to the applicant and sufficiently complete applications are forwarded to the planning staff for review.

**REVIEW BY STAFF:** Planning staff reviews the application to determine compliance with the Unified Development Ordinance (UDO). If the application is determined not to be compliant with the UDO, comments will be sent to the applicant. The applicant must address all staff comments before any public hearings are scheduled.

**PUBLIC HEARING NOTIFICATION:** Notification of the public hearing will take place by three different methods. A written notice will be sent to nearby property owners not more than 25 days nor less than 14 days prior to the public hearings, as required by the UDO. The Planning Department will prepare these written notifications for all property owners of the land subject to the application and all property owners within 300 feet of the land subject to the application. A notice will be published on the Town of Apex website ([www.apexnc.org](http://www.apexnc.org)) no less than 10 days, but not more than 25 days, prior to the public hearings, and a notice will be posted at the land subject to the application at least 14 days prior to the public hearings.

**1<sup>ST</sup> PUBLIC HEARING/PLANNING BOARD MEETING:** The Planning Board will consider the application, relevant support materials, the Staff Report and public testimony given at the public hearing. After the public hearing the Planning Board will make a recommendation to the Town Council. The Planning Board may recommend approval, approval with conditions or disapproval. The application is then forwarded to the Town Council. The Planning Board meets at 4:30 p.m. in the Town Hall Council Chambers on the date indicated on the Rezoning Schedule.

**2<sup>ND</sup> PUBLIC HEARING/TOWN COUNCIL MEETING:** The Town Council will consider the application, relevant support materials, the Staff Report, the Planning Board recommendation and public testimony given at the public hearing. After the public hearing the Town Council will vote to approve, approve with conditions or disapprove the rezoning. The Town Council meets at 6:00 p.m. in the Town Council Chambers on the date indicated on the Rezoning Schedule.

## PLANNED UNIT DEVELOPMENT APPLICATION

This document is a public record under the North Carolina Public Records Act and may be published on the Town's website or disclosed to third parties.

Application #: 20CZ14 Submittal Date: 11-2-20  
Fee Paid: \$ \$2,300 Check #: \_\_\_\_\_

## PETITION TO AMEND THE OFFICIAL ZONING DISTRICT MAP

Project Name: Hackney Tracts  
Address(es): 2600 Olive Chapel Road, 2500 Olive Chapel Road, & 0 Olive Chapel Road  
PIN(s) 0721492629, 0722406699, & 0722411102

\_\_\_\_\_ Acreage: 79.79 ac.  
Current Zoning: RR & R-80W Proposed Zoning: PUD-CZ  
Current 2045 LUM Designation: Med. Density Residential  
Requested 2045 LUM Designation: Med. Density Residential  
See next page for LUM amendment

If any portion of the project is shown as mixed use (3 or more stripes on the 2045 Land Use Map) provide the following:

Area classified as mixed use: Acreage: 0 ac.  
Area proposed as non-residential development: Acreage: 0 ac.  
Percent of mixed use area proposed as non-residential: Percent: 0%

## Applicant Information

Name: WithersRavenel  
Address: 137 S. Wilmington Street, Suite 200  
City: Raleigh State: NC Zip: 27601  
Phone: 919.469.3340 E-mail: bvega@withersravenel.com

## Owner Information

|  |   |   |
|--|---|---|
| PIN: 0721492629<br>Owner: GOODWIN, EDWIN A<br>Address: Judy Hackney. 2505 Olive Chapel Rd., Apex, NC 27502 | PIN: 0722406699<br>Owner: HACKNEY, CHARLES LEON HACKNEY, JUDY G<br>Address: 2505 Olive Chapel Rd., Apex, NC 27502 | PIN: 0722411102<br>Owner: HACKNEY, JUDY G<br>Address: 2505 Olive Chapel Rd., Apex, NC 27502 |
|--|---|---|

## Agent Information

Name: Brendie Vega, WithersRavenel  
Address: 137 S. Wilmington Street, Suite 200  
City: Raleigh State: NC Zip: 27601  
Phone: 919.469.3340 E-mail: bvega@withersravenel.com

Other contacts: Glenda Toppe  
\_\_\_\_\_  
\_\_\_\_\_



## Legal description for Tract 1 Hackney Property

Beginning at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road, Thence, following the Northern Margin of Olive Chapel Road; South 70°32'42" West, 65.39 feet to a point, said point being the **True Point of Beginning**. Thence, following the Northern Margin of Olive Chapel Road, South 70°31'17" West, 649.92 feet to a point, Thence, Leaving Said Road, North 34°12'20" West, 445.67 feet to a point; Thence, North 00°58'41" West, 436.43 feet to a point; Thence, North 85°35'51" West, 339.02 feet to an Existing Iron Pipe; Thence, South 02°31'45" West, 382.15 feet to an Existing Iron Pipe; Thence, North 87°46'36" West, 443.92 feet to an Existing Iron Pipe; Thence, North 01°42'56" East, 1,191.60 feet to an Existing Iron Pipe; Thence, North 01°42'19" East, 635.94 feet to a point located in the centerline of a creek, Said point being located South 01°42'19" West, 8.02 feet from an Existing Iron Pipe found on the North bank of the creek; Thence, along the centerline of the creek the following seventy-eight (78) calls:  
North 62°12'20" East, 26.95 feet to a point; Thence, North 85°25'51" East, 12.16 feet to a point; Thence, South 89°25'18" East, 9.95 feet to a point; Thence, North 72°42'15" East, 16.28 feet to a point; Thence, North 35°12'38" East, 17.29 feet to a point; Thence, North 04°12'00" East, 12.96 feet to a point; Thence, North 21°34'14" West, 18.72 feet to a point; Thence, North 09°03'47" West, 8.16 feet to a point, Thence, North 41°28'27" East, 26.53 feet to a point, Thence, South 84°15'14" East, 11.15 feet to a point, Thence, South 44°43'11" East, 19.83 feet to a point, Thence, South 71°15'05" East, 13.95 feet to a point, Thence, South 74°11'34" East, 15.85 feet to a point, Thence, South 74°44'51" East, 12.72 feet to a point, Thence, South 83°49'13" East, 3.99 feet to a point, Thence, North 64°08'10" East, 16.34 feet to a point, Thence, North 47°07'30" East, 15.60 feet to a point, Thence, South 78°20'55" East, 15.26 feet to a point, Thence, South 56°02'16" East, 5.33 feet to a point, Thence, South 19°19'09" East, 6.90 feet to a point, Thence, South 56°44'29" East, 12.49 feet to a point, Thence, South 83°31'01" East, 16.05 feet to a point, Thence, North 59°49'27" East, 15.58 feet to a point, Thence, North 16°43'28" East, 6.92 feet to a point, Thence, North 01°57'42" West, 8.52 feet to a point, Thence, North 19°34'33" West, 8.53 feet to a point, Thence, North 22°27'53" West, 25.52 feet to a point, Thence, North 08°13'00" West, 17.60 feet to a point, Thence, North 13°08'01" West, 25.39 feet to a point, Thence, North 19°34'33" West, 12.83 feet to a point, Thence, North 00°51'00" East, 8.68 feet to a point, Thence, North 37°09'53" East, 11.70 feet to a point, Thence, North 49°22'35" East, 26.46 feet to a point, Thence, North 62°21'20" East, 30.37 feet to a point, Thence, North 67°46'29" East, 19.95 feet to a point, Thence, North 02°19'02" West, 8.02 feet to a point, Thence, North 48°37'20" West, 9.79 feet to a point, Thence, North 51°28'51" West, 14.82 feet to a point, Thence, North 10°18'42" West, 10.15 feet to a point, Thence, North 29°53'30" East, 7.06 feet to a point, Thence, North 67°41'49" East, 9.59 feet to a point, Thence, South 56°14'07" East, 5.77 feet to a point, Thence, South 63°24'14" East, 9.29 feet to a point, Thence, South 76°41'34" East, 9.25 feet to a point, Thence, North 77°10'45" East, 14.30 feet to a point, Thence, North 49°00'07" East, 13.34 feet to a point, Thence, North 10°50'19" West, 12.26 feet to a point, Thence, North 64°58'17" West, 15.90 feet to a point, Thence, North 31°59'29" West, 7.02 feet to a point, Thence, North 01°03'18" West, 7.87 feet to a point, Thence, North 17°34'16" East, 24.60 feet to a point, Thence, North 26°59'18" East, 8.17 feet to a point, Thence, South 81°51'44" East, 16.60 feet to a point, Thence, South 33°48'00" East, 15.96 feet to a point, Thence, South 49°25'00" East, 16.68 feet to a point, Thence, North 78°59'30" East, 12.42 feet to a point, Thence, North 50°28'53" East, 20.42 feet to a point, Thence, North 70°44'43" East, 46.11 feet to a point, Thence, South 89°01'57" East, 16.84 feet to a point, Thence, South 73°56'31" East, 11.76 feet to a point, Thence, North 66°33'30" East, 13.41 feet to a point, Thence, North 10°20'58" East, 8.36 feet to a point, Thence, North 17°44'49" West, 19.09 feet to a point, Thence, North 07°53'24" East, 12.39 feet to a point, Thence, North 59°58'19" East, 13.53 feet to a point, Thence, South 42°16'28" East, 13.69 feet to

a point, Thence, South 04°17'52" West, 12.70 feet to a point, Thence, South 10°35'03" West, 9.31 feet to a point, Thence, South 32°25'41" East, 5.70 feet to a point, Thence, South 46°46'35" East, 17.73 feet to a point, Thence, South 60°06'25" East, 16.74 feet to a point, Thence, North 86°29'56" East, 19.64 feet to a point, Thence, North 81°25'49" East, 16.54 feet to a point, Thence, South 80°06'27" East, 29.38 feet to a point, Thence, South 84°39'29" East, 22.26 feet to a point, Thence, North 58°33'23" East, 13.24 feet to a point, Thence, North 74°43'49" East, 8.91 feet to a point, Thence, leaving the centerline of said creek, South 20°58'05" East, 22.05 feet to a point, Thence, South 20°45'12" East, 790.03 feet to an Existing Iron Pipe, Thence, South 56°33'25" East, 611.03 feet to an Existing Iron Pipe, Thence, South 78°41'14" West, 615.50 feet to a point, Thence, South 11°18'46" East, 791.04 feet to a point, Thence, North 78°41'14" East, 566.96 feet to a point, Thence, South 09°38'52" East, 536.92 feet to a point, being the **True Point of Beginning**, and having an area of 51.280 Acres, more or less.

**Together with the following area located within the public right of way of Olive Chapel Road**

Beginning at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road, Thence, following the Northern Margin of Olive Chapel Road; South 70°32'42" West, 65.39 feet to a point, said point being the **True Point of Beginning**. Thence, South 70°29'55" West, 636.77 feet to a point; Thence, North 34°12'20" West, 31.27 feet to a point; Thence, North 70°31'17" East, 649.92 feet to a point; Thence, South 09°38'52" East, 30.43 feet to a point; being the **True Point of Beginning**, and having an area of 0.445 Acres (19,375 sf), more or less.

## Legal description for Tract 2 Hackney Property

Beginning at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road, Thence, following the Northern Margin of Olive Chapel Road; South 70°32'42" West, 65.39 feet to a point; Thence, South 70°31'17" West, 649.92 feet to a point, said point being the **True Point of Beginning**.

Thence, following the Northern Margin of Olive Chapel Road, South 70°19'56" West, 682.58 feet to a New Iron Pipe, Thence, Leaving Said Right of Way, Thence, North 02°31'13" East, 5.41 feet to an Existing Iron Pipe; Thence, North 02°31'13" East, 674.17 feet to an Existing Iron Pipe; Thence, North 02°31'45" East, 382.15 feet to an Existing Iron Pipe; Thence, South 85°35'51" East, 339.02 feet to a point, Thence, South 00°58'41" East, 436.43 feet to a point; Thence, South 34°12'20" East, 445.67 feet to a point, being the **True Point of Beginning**, and having an area of 9.526 Acres, more or less.

## **Together with the following area located within the public right of way of Olive Chapel Road**

Beginning at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road, Thence, following the Northern Margin of Olive Chapel Road; South 70°32'42" West, 65.39 feet to a point; Thence, South 70°31'17" West, 649.92 feet to a point, said point being the **True Point of Beginning**.

Thence, South 34°12'20" East, 31.27 feet to a point; Thence, South 70°19'56" West, 702.77 feet to a point; Thence, North 02°31'13" East, 32.69 feet to a New Iron Pipe; Thence, North 70°19'56" East, 682.58 feet to a point; being the **True Point of Beginning**, and having an area of 0.481 Acres (20,967 sf), more or less.

## Legal description for Tract 3 Hackney Property

**Beginning** at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road, Thence, following the Northern Margin of Olive Chapel Road; South 70°32'42" West, 65.39 feet to a point; Thence, Leaving said Right of Way, North 09°38'52" West, 536.92 feet to a point; Thence, South 78°41'14" West, 566.96 feet to a point; Thence, North 11°18'46" West, 791.04 feet to a point; Thence, North 78°41'14" East, 615.50 feet to an Existing Iron Pipe; Thence, South 11°18'46" East, 500.58 feet to an Existing Iron Pipe; Thence, South 11°21'53" East, 392.29 feet to an Existing Iron Pipe; Thence, South 11°20'41" East, 425.59 feet to an Existing Iron Pipe, being the Point of **Beginning**, and having an area of 11.871 Acres, more or less.

## **Together with the following area located within the public right of way of Olive Chapel Road**

**Beginning** at an Existing Iron Pipe located at the Southwest corner of Lot 1, "William E. Gerringer Subdivision", Recorded at Map Book 1982, Page 24, Wake County Registry. Said Existing Iron Pipe having North Carolina Geodetic Coordinates (NAD 83, 2011) N: 719,823.90', E: 2,025,316.49' Said point is also located on the Northern Margin of Olive Chapel Road; Thence, South 11°20'41" East, 30.29 feet to a point; Thence, South 70°32'42" West, 66.30 feet to a point; Thence, North 09°38'52" West, 30.43 feet to a point; Thence, North 70°32'42" East, 65.39 feet to an Existing Iron Pipe, being the Point of Beginning, and having an area of 0.045 acres (1,975 sf), more or less.

**AGENT AUTHORIZATION FORM**

Application #: 20CZ14

Submittal Date: 11-2-20

Hackney, Judy G is the owner\* of the property for which the attached application is being submitted:

- Land Use Amendment
- Rezoning: For Conditional Zoning and Planned Development rezoning applications, this authorization includes express consent to zoning conditions that are agreed to by the Agent which will apply if the application is approved.
- Site Plan
- Subdivision
- Variance
- Other: \_\_\_\_\_

The property address is: 0 Olive Chapel Road (PIN 0722411102)

The agent for this project is: WithersRavenel

I am the owner of the property and will be acting as my own agent

Agent Name: Brendie Vega

Address: 137 S. Wilmington Street, Suite 200

Telephone Number: 919.535.5212

E-Mail Address: bvega@withersravenel.com

Signature(s) of Owner(s)\*

Judy G. Hackney  
Judy G. Hackney  
 Type or print name

Oct 27, 2020  
 Date

\_\_\_\_\_  
 Type or print name

\_\_\_\_\_  
 Date

Attach additional sheets if there are additional owners.

\*Owner of record as shown on the latest equalized assessment rolls of Wake County. An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this authorization.

Pursuant to Article 40 of Chapter 66 of the North Carolina General Statutes (the Uniform Electronic Transactions Act) this application and all documents related hereto containing an electronic or digitized signature are legally binding in the same manner as are hard copy documents executed by hand signature. The parties hereby consent to use electronic or digitized signatures in accordance with the Town's Electronic Signature Policy and intend to be bound by the application and any related documents. If electronic signatures are used the application shall be delivered in an electronic record capable of retention by the recipient at the time of receipt.



**AGENT AUTHORIZATION FORM**

Application #: 20CZ14 Submittal Date: 11-2-20

Hackney, Charles Leon Hackney, Judy G is the owner\* of the property for which the attached application is being submitted:

- Land Use Amendment
- Rezoning: For Conditional Zoning and Planned Development rezoning applications, this authorization includes express consent to zoning conditions that are agreed to by the Agent which will apply if the application is approved.
- Site Plan
- Subdivision
- Variance
- Other: \_\_\_\_\_

The property address is: 2500 Olive Chapel Road (PIN 0722406699)

The agent for this project is: WithersRavenel

I am the owner of the property and will be acting as my own agent

Agent Name: Brendie Vega

Address: 137 S. Wilmington Street, Suite 200

Telephone Number: 919.535.5212

E-Mail Address: bvega@withersravenel.com

Signature(s) of Owner(s)\*

*Charles Leon Hackney, Sr*  
Charles Leon Hackney  
 Type or print name

Oct 27, 2020  
Date

*Judy G. Hackney*  
Judy G. Hackney  
 Type or print name

Oct 27, 2020  
Date

Attach additional sheets if there are additional owners.

\*Owner of record as shown on the latest equalized assessment rolls of Wake County. An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this authorization.

Pursuant to Article 40 of Chapter 66 of the North Carolina General Statutes (the Uniform Electronic Transactions Act) this application and all documents related hereto containing an electronic or digitized signature are legally binding in the same manner as are hard copy documents executed by hand signature. The parties hereby consent to use electronic or digitized signatures in accordance with the Town's Electronic Signature Policy and intend to be bound by the application and any related documents. If electronic signatures are used the application shall be delivered in an electronic record capable of retention by the recipient at the time of receipt.

**AGENT AUTHORIZATION FORM**

Application #: 20CZ14 Submittal Date: 11-2-20

Goodwin, Edwin A is the owner\* of the property for which the attached application is being submitted:

- Land Use Amendment
- Rezoning: For Conditional Zoning and Planned Development rezoning applications, this authorization includes express consent to zoning conditions that are agreed to by the Agent which will apply if the application is approved.
- Site Plan
- Subdivision
- Variance
- Other: \_\_\_\_\_

The property address is: 2600 Olive Chapel Road (PIN 0721492629)

The agent for this project is: WithersRavenel

I am the owner of the property and will be acting as my own agent

Agent Name: Brendie Vega

Address: 137 S. Wilmington Street, Suite 200

Telephone Number: 919.535.5212

E-Mail Address: bvega@withersravenel.com

Signature(s) of Owner(s)\*

Judy G. Hackney, Trustee  
Judy G. Hackney, Trustee of the Edwin  
A. Goodwin Testamentary Trust Type or print name \_\_\_\_\_ Date \_\_\_\_\_

Charles Leon Hackney, Sr  
Charles Leon Hackney, Sr Type or print name \_\_\_\_\_ Date Oct 27, 2020

Attach additional sheets if there are additional owners.

\*Owner of record as shown on the latest equalized assessment rolls of Wake County. An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this authorization.

Pursuant to Article 40 of Chapter 66 of the North Carolina General Statutes (the Uniform Electronic Transactions Act) this application and all documents related hereto containing an electronic or digitized signature are legally binding in the same manner as are hard copy documents executed by hand signature. The parties hereby consent to use electronic or digitized signatures in accordance with the Town's Electronic Signature Policy and intend to be bound by the application and any related documents. If electronic signatures are used the application shall be delivered in an electronic record capable of retention by the recipient at the time of receipt.



**AFFIDAVIT OF OWNERSHIP**

Application #: 20CZ14

Submittal Date: 11-2-20

The undersigned, Judy G. Hackney (the "Affiant") first being duly sworn, hereby swears or affirms as follows:

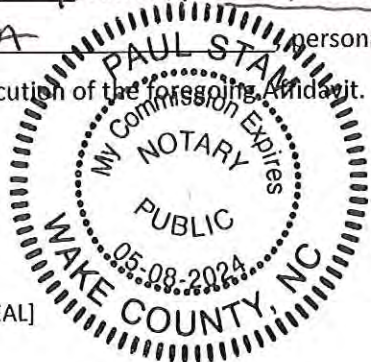
- Affiant is over eighteen (18) years of age and authorized to make this Affidavit. The Affiant is the sole owner, or is the authorized agent of all owners, of the property located at \_\_\_\_\_ and legally described in Exhibit "A" attached hereto and incorporated herein (the "Property").
- This Affidavit of Ownership is made for the purpose of filing an application for development approval with the Town of Apex.
- If Affiant is the owner of the Property, Affiant acquired ownership by deed, dated \_\_\_\_\_, and recorded in the Wake County Register of Deeds Office on \_\_\_\_\_, in Book \_\_\_\_\_ Page \_\_\_\_\_.
- If Affiant is the authorized agent of the owner(s) of the Property, Affiant possesses documentation indicating the agency relationship granting the Affiant the authority to apply for development approval on behalf of the owner(s).
- If Affiant is the owner of the Property, from the time Affiant was deeded the Property on \_\_\_\_\_, Affiant has claimed sole ownership of the Property. Affiant or Affiant's predecessors in interest have been in sole and undisturbed possession and use of the property during the period of ownership. Since taking possession of the Property on \_\_\_\_\_, no one has questioned Affiant's ownership or right to possession nor demanded any rents or profits. To Affiant's knowledge, no claim or action has been brought against Affiant (if Affiant is the owner), or against owner(s) (if Affiant is acting as an authorized agent for owner(s)), which questions title or right to possession of the property, nor is any claim or action pending against Affiant or owner(s) in court regarding possession of the Property.

This the 27 day of October, 2020.

Judy G. Hackney (seal)  
Judy G. Hackney individually and as Trustee  
 Type or print name  
Charles Leon Hackney, Sr.

STATE OF NORTH CAROLINA  
COUNTY OF Wake

I, the undersigned, a Notary Public in and for the County of Wake, hereby certify that Judy G. Hackney and Charles Leon Hackney Sr. Affiant, personally known to me or known to me by said Affiant's presentation of said Affiant's N/A personally appeared before me this day and acknowledged the due and voluntary execution of the foregoing Affidavit.



[NOTARY SEAL]

Paul Stam  
 Notary Public  
 State of North Carolina  
 My Commission Expires: May 8, 2024

**TOWN OF APEX UTILITIES OFFER AND AGREEMENT**

Application #: 20CZ14 Submittal Date: 11-2-20

**Town of Apex  
73 Hunter Street  
P.O. Box 250 Apex, NC 27502  
919-249-3400**

WAKE COUNTY, NORTH CAROLINA CUSTOMER SELECTION AGREEMENT

Wake County PINs: 0721492629, 0722411102, 0722406699

0, 2500, 2600 Olive Chapel Road

(the "Premises")

The Town of Apex offers to provide you with electric utilities on the terms described in this Offer & Agreement. If you accept the Town's offer, please fill in the blanks on this form and sign and we will have an Agreement once signed by the Town.

Hackney, Judy et al, the undersigned customer ("Customer") hereby irrevocably chooses and selects the Town of Apex (the "Town") as the permanent electric supplier for the Premises. Permanent service to the Premises will be preceded by temporary service if needed.

The sale, delivery, and use of electric power by Customer at the Premises shall be subject to, and in accordance with, all the terms and conditions of the Town's service regulations, policies, procedures and the Code of Ordinances of the Town.

Customer understands that the Town, based upon this Agreement, will take action and expend funds to provide the requested service. By signing this Agreement the undersigned signifies that he or she has the authority to select the electric service provider, for both permanent and temporary power, for the Premises identified above.

Any additional terms and conditions to this Agreement are attached as Appendix 1. If no appendix is attached this Agreement constitutes the entire agreement of the parties.

Acceptance of this Agreement by the Town constitutes a binding contract to purchase and sell electric power.


Please note that under North Carolina General Statute §160A-332, you may be entitled to choose another electric supplier for the Premises.

Upon acceptance of this Agreement, the Town of Apex Electric Utilities Division will be pleased to provide electric service to the Premises and looks forward to working with you and the owner(s).

ACCEPTED:

CUSTOMER: Hackney, Judy, et. al

TOWN OF APEX

BY: Brendie Vega   
Authorized Agent

BY: \_\_\_\_\_  
Authorized Agent

DATE: 11/2/2020

DATE: \_\_\_\_\_

## DEVELOPMENT NAME APPROVAL APPLICATION

Application #: 20CZ14

Submittal Date: 11-2-20

Fee for Initial Submittal: No Charge

Fee for Name Change after Approval: \$500\*

### Purpose

To provide a consistent and clearly stated procedure for the naming of subdivisions and/or developments and entrance roadways (in conjunction with *Town of Apex Address Policy*) so as to allow developers to define and associate the theme or aesthetics of their project(s) while maintaining the Town's commitment to preserving the quality of life and safety for all residents of Apex proper and extraterritorial jurisdiction.

### Guidelines

- ✓ The subdivision/development name shall not duplicate, resemble, or present confusion with an existing subdivision/development within Apex corporate limits or extraterritorial jurisdiction except for the extension of an existing subdivision/development of similar or same name that shares a continuous roadway.
- ✓ The subdivision/development name shall not resemble an existing street name within Apex corporate limits or extraterritorial jurisdiction unless the roadway is a part of the subdivision/development or provides access to the main entrance.
- ✓ The entrance roadway of a proposed subdivision/development shall contain the name of the subdivision/development where this name does not conflict with the Town of Apex *Road Name Approval Application* and *Town of Apex Address Policy* guidelines.
- ✓ The name "Apex" shall be excluded from any new subdivision/development name.
- ✓ Descriptive words that are commonly used by existing developments will be scrutinized more seriously in order to limit confusion and encourage distinctiveness. A list of commonly used descriptive words in Apex's jurisdiction is found below.
- ✓ The proposed subdivision/development name must be requested, reviewed and approved during preliminary review by the Town.
- ✓ A \$500.00 fee will be assessed to the developer if a subdivision/development name change is requested after official submittal of the project to the Town.\*

\*The imposed fee offsets the cost of administrative changes required to alleviate any confusion for the applicant, Planning staff, other Town departments, decision-making bodies, concerned utility companies and other interested parties. There is no charge for the initial name submittal.

### Existing Development Titles, Recurring

|            | Residential                            | Non-Residential                         |
|------------|--|---|
| 10 or more | Creek, Farm(s), Village(s),            | Center/Centre                           |
| 6 to 9     | Crossing(s), Park, Ridge, Wood(s)      | Commons, Park                           |
| 3 to 5     | Acres, Estates, Glen(s), Green*, Hills | Crossing(s), Plaza, Station, Village(s) |

\*excludes names with Green Level



CERTIFIED LIST OF NEIGHBORING PROPERTY OWNERS

Application #: \_\_\_\_\_

Submittal Date: 11-2-20

Provide a certified list of property owners subject to this application and all property owners within 300' of the subject property and HOA Contacts.

|     | Owner's Name  | PIN |
|-----|---|-----|
| 1.  | <span style="border: 1px solid red; padding: 2px;">See Attachment.</span> |     |
| 2.  |   |     |
| 3.  |   |     |
| 4.  |   |     |
| 5.  |   |     |
| 6.  |   |     |
| 7.  |   |     |
| 8.  |   |     |
| 9.  |   |     |
| 10. |   |     |
| 11. |   |     |
| 12. |   |     |
| 13. |   |     |
| 14. |   |     |
| 15. |   |     |

I, Brendie Vega, certify that this is an accurate listing of all property owners and property owners within 300' of the subject property.

Date: 11/2/2020

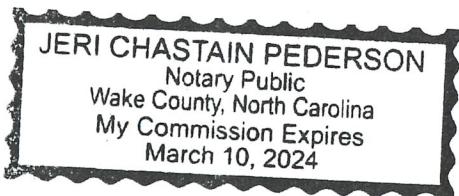
By: *Brendie Vega*

COUNTY OF WAKE STATE OF NORTH CAROLINA

Sworn and subscribed before me, Jeri Chastain Pederson, a Notary Public for the above State and County, on this the 2 day of November, 2020.

*Jeri Chastain Pederson*  
Notary Public  
Jeri Chastain Pederson  
Print Name

SEAL



My Commission Expires: 03/10/2024

**Certified List of Neighboring Property Owners**

| #  | OWNER   | PIN       |
|----|---|-----------|
| 1  | GARWOOD, MARGARET GARWOOD, JOHN J               | 721396377 |
| 2  | CENIS, NATHAN T CENIS, EMILY ANNE               | 721396585 |
| 3  | HURLEY, SONIA R HURLEY, ROBERT                  | 721397152 |
| 4  | HORNEY, DIANNA HORNEY, JOEY MICHAEL             | 721397339 |
| 5  | SMITH FARM OF APEX HOMEOWNERS ASSOCIATION, INC. | 721397362 |
| 6  | RILEY, JAMES EDWARD JR DODSON, JILLIAN SMITH    | 721397491 |
| 7  | KOSHY, SIBY VARKEY KOSHY, THARU SARA            | 721397536 |
| 8  | ZHOU, QUAN LIU, SHUZHANG                        | 721397599 |
| 9  | LABRU, VINEET UCHIL, SHRUTI KARUNAKAR           | 721398442 |
| 10 | KONAKATI, VIKRAM BHIMAVARAPU, PRATHYUSHA        | 721399015 |
| 11 | SAMPATH, PRABHU PRABHU, DEEPA                   | 721399121 |
| 12 | MATTHEWS, JOHN HENRY III                        | 721399127 |
| 13 | ARCADIA RIDGE HOMEOWNERS ASSOCIATION, INC.      | 721399233 |
| 14 | LACOSTE, FABRICE SANROMAN, STEPHANIE            | 721399404 |
| 15 | DE SOUSA, ALDO SILVIO CARNEIRO                  | 721399466 |
| 16 | LEDESMA, FELIPE ATENCIO, IBELISE MARIA          | 721399630 |
| 17 | MARKS, REBECCA R MARKS, JONATHAN A              | 721399646 |
| 18 | RUBIN, BEVERLY L                                | 721482119 |
| 19 | AUSTVOLD, SHAWN AUSTVOLD, JENNIFER              | 721491084 |
| 20 | RILEY'S POND HOMEOWNERS ASSOCIATION INC         | 721491103 |
| 21 | CAVERO, CLAUDIA MARIANA BENAVIDES               | 721491270 |
| 22 | RILEY'S POND HOMEOWNERS ASSOCIATION INC         | 721491342 |
| 23 | LEWIS, ANGEL SPENCE LEWIS, COURTNEY DEVON       | 721492100 |
| 24 | RILEY'S POND HOMEOWNERS ASSOCIATION INC         | 721492366 |
| 25 | WEBB, XAVIER JOHAN                              | 721492372 |
| 26 | JOYCE, JOHN D JOYCE, ROSEMARY                   | 721493109 |
| 27 | ALJADER, MAYSAM ALJADER, LORI                   | 721493206 |
| 28 | LEARY, BRAD LEARY, BRENDA                       | 721494283 |
| 29 | BAKER, SCOTT J BAKER, MARLO L H                 | 721495137 |
| 30 | SMITH FARM OF APEX HOMEOWNERS ASSOCIATION, INC. | 721396648 |
| 31 | RAJAN, SUNIL KUMAR OLIPARAMBIL PREMRAJ, RITHU   | 721396847 |
| 32 | GANJI, BHAGYA LATHA RAMPA, IMMANUEL             | 721396870 |
| 33 | GARABEDIAN, MATTHEW KANG, EY JUNG               | 721396975 |
| 34 | BALAPURE, LAXMIKANT MALVI, VISHAKHA             | 721397746 |
| 35 | ESBJORN, ROBERT ESBJORN, AUDREY                 | 721397948 |
| 36 | CHEN, DANDAN WANG, YANG                         | 721398717 |
| 37 | MCCALL, NATHAN RF GIULIANI, TRACY J             | 721398917 |
| 38 | SIDDIQUI, ALI SIDDIQUI, TARANNUM                | 721399742 |
| 39 | PANDEY, ROSHAN RAJ                              | 721399757 |
| 40 | WILSON, BENJAMIN THOMAS THOMAS, JULIE ELIZABETH | 721399853 |
| 41 | PANDEY, NAMIT JOSHI, TARA                       | 721399859 |
| 42 | BRUMFIELD, RYAN MATTHEW BRUMFIELD, AMANDA PLOCH | 721399954 |
| 43 | MOCK, CHRISTOPHER RICHARD MOCK, ELENA BARRIO    | 721399969 |
| 44 | BOLJESIC, JONATHON ELLIS BOLJESIC, VINCA PURI   | 721494337 |
| 45 | MARTIN, JOANNE H                                | 721494350 |

**Certified List of Neighboring Property Owners**

| #  | OWNER  | PIN       |
|----|--|-----------|
| 46 | RILEY'S POND HOMEOWNERS ASSOCIATION INC              | 721494411 |
| 47 | DONALDSON, MARK R DONALDSON, HEATHER M               | 721495361 |
| 48 | GOTUR, RAGHAVENDER THAMMISSETTY, RADHIKA             | 721495379 |
| 49 | KENT, THOMAS L. KENT, LEIGH R.                       | 721496224 |
| 50 | CHOI, KENNY JUNG, JIN                                | 721496464 |
| 51 | SINGH, SUNIL SINGH, PANCHALI                         | 721497298 |
| 52 | LEDESMA, ROBERTO LEDESMA, CARMEN                     | 721497385 |
| 53 | RILEY'S POND HOMEOWNERS ASSOCIATION INC              | 721497414 |
| 54 | KUMAR VARMA, CHITRA DILEEP ADUKKATH, BISHAK          | 721497452 |
| 55 | KNAPP, GEARY W KNAPP, SUSAN                          | 721499346 |
| 56 | LENNAR CAROLINAS, LLC                                | 722219077 |
| 57 | LENNAR CAROLINAS, LLC                                | 722229350 |
| 58 | LENNAR CAROLINAS, LLC                                | 722303175 |
| 59 | SMITH FARM OF APEX HOMEOWNERS ASSC INC               | 722303478 |
| 60 | BAITER, STEVE MICHAEL BAITER, REAGAN                 | 722303663 |
| 61 | JOSEPH, BIKKU B VALIYAVEETIL, SAJIN J                | 722303770 |
| 62 | BROCK, SIMON PAUL BROCK, ELISA SAYURI JISAK          | 722303779 |
| 63 | NICOLAU, DANIEL NICOLAU, MARIA SIMONA                | 722303837 |
| 64 | SANDBERG, GEOFFREY ERIK SANDBERG, RACHEL ANN         | 722304905 |
| 65 | PITMAN, WESLEY SZYDLOWSKI, JESSICA                   | 722305447 |
| 66 | DYK, SHAUN M BIGELOW DYK, MELINDA M                  | 722305656 |
| 67 | SMITH FARM OF APEX HOMEOWNERS ASSOCIATION, INC.      | 722309093 |
| 68 | PIKULIK, KENNETH CHARLES GUARD-PIKULIK, MEGAN THAYER | 722313076 |
| 69 | KLEIN, CAROLINE KLEIN, STEVEN                        | 722327144 |
| 70 | FEDERICO, MICHELLE EDERY, ARIEL                      | 722327201 |
| 71 | SWEETWATER PROPERTY OWNERS ASSOCIATION, INC          | 722327341 |
| 72 | RUTIGLIANO, JOHN P RUTIGLIANO, KAREN E               | 722327354 |
| 73 | PAYNE, DEAN ALAN PAYNE, LISA O'HARA                  | 722327358 |
| 74 | CLEARY, MICHAEL CLEARY, MAUREEN                      | 722327452 |
| 75 | FERGUSON, MICHAEL R FERGUSON, JESSICA J              | 722327455 |
| 76 | FAIRHURST, JOSHUA FAIRHURST, AMANDA L                | 722327459 |
| 77 | DUFFMAN, MARY WEBB                                   | 722329579 |
| 78 | BENNETT, JESSICA SOPHIA BENNETT, RYAN CLARK          | 722416567 |
| 79 | SMITH, SCOTT ROBERT SMITH, KIMBERLY DAWN             | 722416644 |
| 80 | CRESCENT APEX LLC                                    | 722416751 |
| 81 | CRESCENT APEX LLC                                    | 722416778 |
| 82 | CRESCENT APEX LLC                                    | 722416847 |
| 83 | VLADIMIROVA, ANNA V HOBBS, MERLIN E                  | 722417467 |
| 84 | DUDDUKURI, VENKATA SANDEEP KUMAR ALLU, SOWMYA        | 722417511 |
| 85 | CRESCENT APEX LLC                                    | 722418579 |
| 86 | CRESCENT APEX LLC                                    | 722418624 |
| 87 | CRESCENT APEX LLC                                    | 722419526 |
| 88 | CRESCENT APEX LLC                                    | 722419572 |
| 89 | CRESCENT APEX LLC                                    | 722419696 |



**Certified List of Neighboring Property Owners**

| #   | OWNER  | PIN       |
|-----|--|-----------|
| 90  | LAHRMAN, GREGORY E TRUSTEE GREGORY E. LAHRMAN REVOCABLE LIVING TRUST | 722420650 |
| 91  | SWEETWATER PROPERTY OWNERS ASSOCIATION, INC                          | 722421400 |
| 92  | FUNNA, KUCHI FUNNA, KUCHI M  | 722421612 |
| 93  | CRESCENT APEX LLC  | 722424038 |
| 94  | CRESCENT APEX LLC  | 722429361 |
| 95  | PILLA, ANTHONY MICHAEL PILLA, ANGELA                                 | 722510428 |
| 96  | ASPNES, DAVID E BALL, CYNTHIA J                                      | 721487120 |
| 97  | GOODWIN, EDWIN A   | 721492629 |
| 98  | FOSTER FARM LLC  | 721585231 |
| 99  | MICHALSKI, TIMOTHY MICHALSKI, RHIANNON                               | 721590573 |
| 100 | FOSTER FARM LLC  | 721592562 |
| 101 | FOSTER, FRANK A COPELAND, REBECCA                                    | 721595134 |
| 102 | HACKNEY, CHARLES LEON HACKNEY, JUDY G                                | 722406699 |
| 103 | HACKNEY, JUDY G  | 722411102 |
| 104 | CRESCENT APEX LLC  | 722418369 |
| 105 | PALANIAPPAN, RAMANATHAN VIJAYAKUMAR, HARIPRABHA                      | 722418413 |
| 106 | CRESCENT APEX LLC  | 722419315 |
| 107 | MULLEN, RICHARD ANDREW MULLEN, ELIZABETH CATHERINE                   | 722419361 |
| 108 | PERKINS, ELIZABETH E   | 722503152 |
| 109 | BASS, MICHAEL E BASS, SHERRIE L                                      | 722503445 |
| 110 | BASS, MICHAEL E  | 722505167 |
| 111 | DUGGAN, KIM-MARIE DUGGAN, DOMINICK                                   | 722510237 |
| 112 | CRESCENT APEX LLC  | 722510474 |
| 113 | MONGONE, MERRIDITH MONGONE, FRANK                                    | 722511203 |
| 114 | CRESCENT APEX LLC  | 722511431 |
| 115 | CRESCENT APEX LLC  | 722512006 |
| 116 | TRUSTEES OF THE PINOT PARTNERS REVOCABLE LIVING TR                   | 722512179 |
| 117 | OGNIBENE, DOMINICK OGNIBENE, MARIE ELENA                             | 722512201 |
| 118 | CRESCENT APEX LLC  | 722513145 |
| 119 | CRESCENT APEX LLC  | 722513341 |
| 120 | CRESCENT APEX LLC  | 722514101 |
| 121 | CRESCENT APEX LLC  | 722528250 |

**DEVELOPMENT NAME APPROVAL APPLICATION**

Application #: 20CZ14 Submittal Date: 11-2-20

**Proposed Subdivision/Development Information**

Description of location: 2600, 2500, & 0 Olive Chapel Road

Nearest intersecting roads: Olive Chapel Road / Kythira Drive

Wake County PIN(s): 0721492629, 0722406699, & 0722411102

Township: Apex

**Contact Information (as appropriate)**

Contact person: Brendie Vega

Phone number: 919.535.5212 Fax number: \_\_\_\_\_

Address: 137 S. Wilmington Street, Suite 200

E-mail address: bvega@withersravenel.com

Owner: \_\_\_\_\_

Phone number: \_\_\_\_\_ Fax number: \_\_\_\_\_

Address: \_\_\_\_\_

E-mail address: \_\_\_\_\_

**Proposed Subdivision/Development Name**

1<sup>st</sup> Choice: TBD at time of Subdivision

2<sup>nd</sup> Choice (Optional): \_\_\_\_\_

**Town of Apex Staff Approval:**

\_\_\_\_\_  
Town of Apex Planning Department Staff

\_\_\_\_\_  
Date

# NOTICE OF ELECTRONIC NEIGHBORHOOD MEETING

This document is a public record under the North Carolina Public Records Act and may be published on the Town's website or disclosed to third parties.

10/16/2020

Date

Dear Neighbor:

You are invited to an electronic neighborhood meeting to review and discuss the development proposal at  
 2600, 2500, and 0 Olive Chapel Road 0721492629, 0722406699, & 0722411102

Address(es)

PIN(s)

in accordance with the Town of Apex Electronic Neighborhood Meeting procedures. This meeting is intended to be a way for the applicant to discuss the project and review the proposed plans with adjacent neighbors and neighborhood organizations before the submittal of an application to the Town. This provides neighbors an opportunity to raise questions and discuss any concerns about the impacts of the project before it is officially submitted. If you are unable to attend, you may contact the applicant before or after the meeting is held. Once an application has been submitted to the Town, it may be tracked using the [Interactive Development Map](#) or the [Apex Development Report](#) located on the Town of Apex website at [www.apexnc.org](http://www.apexnc.org). If at all feasible given emergency declarations, limits on in-person gatherings, and social distancing, an additional in-person Neighborhood Meeting may be scheduled and held prior to a public hearing or staff decision on the application.

An Electronic Neighborhood Meeting is required because this project includes (check all that apply):

| Application Type                    |  | Approving Authority                |
|-------------------------------------|--|------------------------------------|
| <input checked="" type="checkbox"/> | Rezoning (including Planned Unit Development)                      | Town Council                       |
| <input type="checkbox"/>            | Major Site Plan  | Town Council (QJPH*)               |
| <input type="checkbox"/>            | Special Use Permit   | Town Council (QJPH*)               |
| <input type="checkbox"/>            | Residential Master Subdivision Plan (excludes exempt subdivisions) | Technical Review Committee (staff) |

\*Quasi-Judicial Public Hearing: The Town Council cannot discuss the project prior to the public hearing.

The following is a description of the proposal (also see attached map(s) and/or plan sheet(s)):

This project involves the proposed rezoning of parcels zoned RR and R-80W to be zoned to PUD-CZ.

The proposed development is intended to be a residential development with a mix of housing products.

(A concept plan will be posted on the project website the day of the meeting.)

Estimated submittal date: 11.02.2020

## MEETING INFORMATION:

Property Owner(s) name(s): Goodwin, Edwin A; Hackney, Charles Leon Hackney, Judy G; & Hackney, Judy G

Applicant(s): WithersRavenel

Contact information (email/phone): bvega@withersravenel.com / 919.535.5212

Electronic Meeting invitation/call in info: Meeting Website: <https://withersravenel.com/meeting/hackney-tracts-rezoning-neighborhood-meeting/>  
Call-In Option: 1-415-655-0001  
Event number: 171 659 8744

Date of meeting\*\*: 10.29.2020

Time of meeting\*\*: 5:00pm - 7:00pm

## MEETING AGENDA TIMES:

Welcome: 5:00pm Project Presentation: 5:10pm Question & Answer: 6:30pm

\*\*Meetings shall occur between 5:00 p.m.-9:00 p.m. on a Monday through Thursday (excluding Town recognized holidays). If you have questions about the general process for this application, please contact the Planning Department at 919-249-3426. You may also find information about the Apex Planning Department and on-going planning efforts at <http://www.apexnc.org/180/Planning>.

# PROJECT CONTACT INFORMATION

This document is a public record under the North Carolina Public Records Act and may be published on the Town's website or disclosed to third parties.

## Development Contacts:

Project Name: Hackney Tracts Zoning: RR & R-80W (Prop. PUD-CZ)  
 Location: 2600, 2500, & 0 Olive Chapel Road  
 Property PIN(s): 0721492629, 0722406699, & 0722411102 Acreage/Square Feet: 79.79 ac. / 3,475,652 sq. ft.

Property Owner: Goodwin, Edwin A; Hackney, Charles Leon Hackney, Judy G; & Hackney, Judy G  
 Address: 2505 Olive Chapel Road  
 City: Apex State: NC Zip: 27502  
 Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Developer: Glenda S. Toppe and Associates  
 Address: 4139 Gardenlake Drive  
 City: Raleigh State: NC Zip: 27612  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Engineer: WithersRavenel  
 Address: 137 S. Wilmington Street, Suite 200  
 City: Raleigh State: NC Zip: 27601  
 Phone: 919.535.5212 Fax: \_\_\_\_\_ Email: bvega@withersravenel.com

Builder (if known): \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

**Please note that Town staff will not have complete information about a proposed development until the application is submitted for review. If you have a question about Town development standards and how they relate to the proposed development, please contact the appropriate staff person listed below.**

## Town of Apex Department Contacts

|  |  |
|--|--|
| Planning Department Main Number<br>(Provide development name or location to be routed to correct planner)  | (919) 249-3426                                     |
| Parks, Recreation & Cultural Resources Department<br>Angela Reincke, Parks Planner   | (919) 249-7468                                     |
| Public Works - Transportation<br>Russell Dalton, Senior Transportation Engineer  | (919) 249-3358                                     |
| Water Resources Department<br>Jessica Bolin, Senior Engineer (Stormwater, Sedimentation & Erosion Control)<br>Stan Fortier, Senior Engineer (Stormwater, Sedimentation & Erosion Control)<br>James Gregg, Utility Engineer (Water & Sewer) | (919) 249-3537<br>(919) 249-1166<br>(919) 249-3324 |
| Electric Utilities Division<br>Rodney Smith, Electric Technical Services Manager   | (919) 249-3342                                     |



### **Providing Input to Town Council:**

Each Town Council meeting agenda includes a Public Forum time when anyone is permitted to speak for three (3) minutes on any topic with the exception of items listed as Public Hearings for that meeting. The Town Council meets on the 1<sup>st</sup> and 3<sup>rd</sup> Tuesdays of each month at 6:00 p.m. (except for holidays, see schedule of meetings at <http://www.apexnc.org/838/Agendas-Minutes>). You may also contact Town Council by e-mail at [AllCouncil@apexnc.org](mailto:AllCouncil@apexnc.org).

### **Private Agreements and Easement Negotiation:**

The Town of Apex cannot enforce private agreements between developers and neighbors and is not a party to the easement and right-of-way negotiation that occurs between developers and neighboring property owners for easements or rights-of-way that are necessary to build the project.

It is recommended that all private agreements be made in writing and that if a property owner feels it necessary, they should obtain private legal counsel in order to protect their interests in both private agreements and during easement negotiations. The only conditions that the Town of Apex can enforce are those conditions that are made a part of the conditional zoning of the property by agreement of the developer and the Town.

As an example, if a developer offers to build a fence for a neighbor to mitigate some impact, the Town can only enforce the construction of the fence if the fence becomes a condition of the rezoning. This would occur by the developer offering the condition as part of their conditional zoning application package or at the Town Council public hearing on the conditional zoning and the Town accepting it as a condition. Private agreements regarding a fence being constructed will not be enforced by the Town.

To request that any agreement with a developer is made a part of the conditional zoning at the time of approval, you may ask at the Town Council public hearing if the agreement is included in the conditions. If it is not, you may request that the Town Council not approve the rezoning without the agreement being included in the conditions (note that it is up to Town Council whether to approve or deny the rezoning but they cannot impose conditions that the applicant does not agree to add). The developer's proposed conditions can be viewed any time after a rezoning is submitted on the Interactive Development Map at: <http://apexnc.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=fa9ba2017b784030b15ef4da27d9e795>

### **Documentation:**

Neighbors to a requested new development and/or rezoning are strongly encouraged to fully document (such as through dated photographs) the condition of their property before any work is initiated for the new development. Stormwater controls installed on developed property are not designed to and will likely not remove 100% of the soil particles transported by stormwater runoff. As a result, creeks and ponds could become cloudy for a period of time after rain events.

# COMMON CONSTRUCTION ISSUES & WHO TO CALL

This document is a public record under the North Carolina Public Records Act and may be published on the Town's website or disclosed to third parties.

## **Noise & Hours of Construction: Non-Emergency Police 919-362-8661**

Noise from tree removal, grading, excavating, paving, and building structures is a routine part of the construction process. The Town generally limits construction hours from 7:00 a.m. to 8:30 p.m. so that there are quiet times even during the construction process. Note that construction outside of these hours is allowed with special permission from the Town when it makes more sense to have the construction occur at night, often to avoid traffic issues. In addition, the Town limits hours of blasting rock to Monday through Friday from 8:00 a.m. to 5:00 p.m. Report violations of construction hours and other noise complaints to the Non-Emergency Police phone number at 919-362-8661.

## **Construction Traffic: James Misciagno 919-372-7470**

Construction truck traffic will be heavy throughout the development process, including but not limited to removal of trees from site, loads of dirt coming in and/or out of the site, construction materials such as brick and wood brought to the site, asphalt and concrete trucks come in to pave, etc. The Town requires a construction entrance that is graveled to try to prevent as much dirt from leaving the site as possible. If dirt does get into the road, the Town can require they clean the street (see "Dirt in the Road" below).

## **Road Damage & Traffic Control: Water Resources – Infrastructure Inspections 919-362-8166**

There can be issues with roadway damage, roadway improvements, and traffic control. Potholes, rutting, inadequate lanes/signing/striping, poor traffic control, blocked sidewalks/paths are all common issues that should be reported to Water Resources – Infrastructure Inspections at 919-249-3427. The Town will get NCDOT involved if needed.

## **Parking Violations: Non-Emergency Police 919-362-8661**

Unless a neighbor gives permission, there should be no construction parking in neighbors' driveways or on their property. Note that parking in the right-of-way is allowed, but Town regulations prohibit parking within 15 feet of driveways so as not to block sight triangles. Trespassing and parking complaints should be reported to the Non-Emergency Police phone number at 919-362-8661.

## **Dirt in the Road: James Misciagno 919-372-7470**

Sediment (dirt) and mud gets into the existing roads due to rain events and/or vehicle traffic. These incidents should be reported to James Misciagno. He will coordinate the cleaning of the roadways with the developer.

## **Dirt on Properties or in Streams: James Misciagno 919-372-7470 Danny Smith [Danny.Smith@ncdenr.gov](mailto:Danny.Smith@ncdenr.gov)**

Sediment (dirt) can leave the site and get onto adjacent properties or into streams and stream buffers; it is typically transported off-site by rain events. These incidents should be reported to James Misciagno at 919-372-7470 so that he can coordinate the appropriate repairs with the developer. Impacts to the streams and stream buffers should also be reported to Danny Smith ([danny.smith@ncdenr.gov](mailto:danny.smith@ncdenr.gov)) with the State.

## **Dust: James Misciagno 919-372-7470**

During dry weather dust often becomes a problem blowing into existing neighborhoods or roadways. These incidents should be reported to James Misciagno at 919-372-7470 so that he can coordinate the use of water trucks onsite with the grading contractor to help control the dust.

## **Trash: James Misciagno 919-372-7470**

Excessive garbage and construction debris can blow around on a site or even off of the site. These incidents should be reported to James Misciagno at 919-372-7470. He will coordinate the cleanup and trash collection with the developer/home builder.

## **Temporary Sediment Basins: James Misciagno 919-372-7470**

Temporary sediment basins during construction (prior to the conversion to the final stormwater pond) are often quite unattractive. Concerns should be reported to James Misciagno at 919-372-7470 so that he can coordinate the cleaning and/or mowing of the slopes and bottom of the pond with the developer.

## **Stormwater Control Measures: Jessica Bolin 919-249-3537**

Post-construction concerns related to Stormwater Control Measures (typically a stormwater pond) such as conversion and long-term maintenance should be reported to Mike Deaton at 919-249-3413.

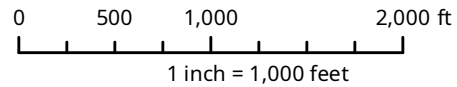
## **Electric Utility Installation: Rodney Smith 919-249-3342**

Concerns with electric utility installation can be addressed by the Apex Electric Utilities Department. Contact Rodney Smith at 919-249-3342.





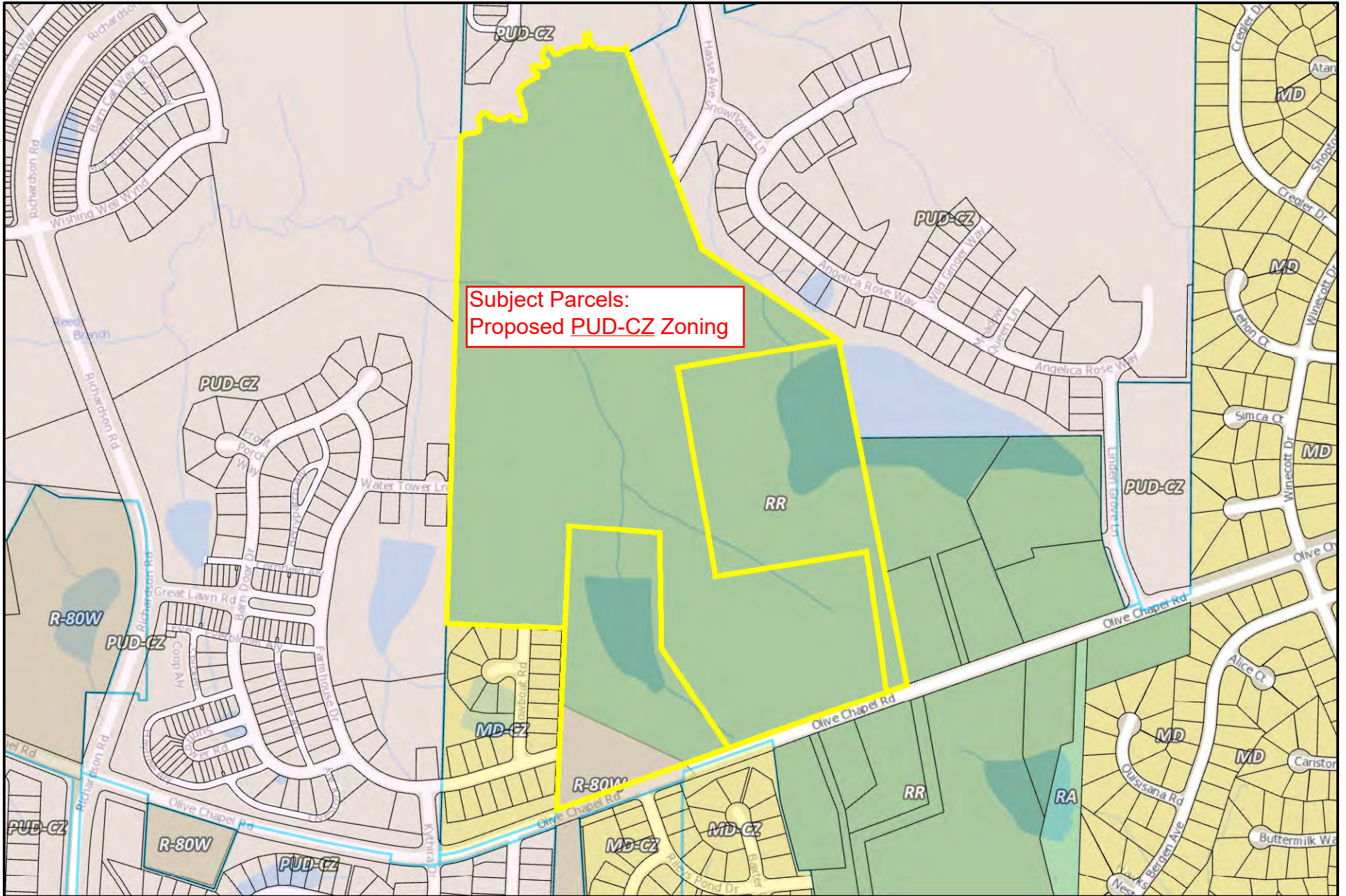
## Vicinity Exhibit



### Disclaimer

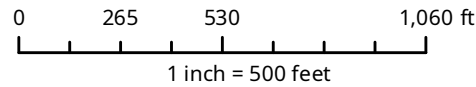
*iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are NOT surveys. No warranties, expressed or implied, are provided for the data therein, its use, or its interpretation.*





Subject Parcels:  
Proposed PUD-CZ Zoning

## Zoning Exhibit



**Disclaimer**

*iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are NOT surveys. No warranties, expressed or implied, are provided for the data therein, its use, or its interpretation.*



| Attendance Count | First Name | Last Name | Affiliation  | Email |
|------------------|------------|-----------|--------------|-------|
| 1                | Brendie    | Vega      | Project Team |       |
| 2                | Nick       | Antrilli  | Project Team |       |
| 3                | Bryant     | Inge      | Project Team |       |
| 4                | Glenda     | Toppe     | Project Team |       |
| 5                | Daniel     | Rauh      | Project Team |       |
| 6                | Jaime      | Hackney   | Neighbor     |       |
| 7                | Cynthia    | Ball      | Neighbor     |       |
| 8                | Jaime      | Hackney   | Neighbor     |       |
| 9                | Cynthia    | Ball      | Neighbor     |       |
| 10               | maysam     | aljader   | Neighbor     |       |
| 11               | Andrew     | Suriano   | Neighbor     |       |
| 12               | Randy      | King      | Neighbor     |       |
| 13               | Chris      | Mock      | Neighbor     |       |
| 14               | Melinda    | Dyk       | Neighbor     |       |
| 15               | David      | Aspnes    | Neighbor     |       |
| 16               | Ryan       | Brumfield | Neighbor     |       |
| 17               | Thomas     | Ball      | Neighbor     |       |
| 18               | Kenny      | Choi      | Neighbor     |       |
| 19               | Beverly    | Rubin     | Neighbor     |       |
| 20               | Tracy      | Giuliani  | Neighbor     |       |
| 21               | Wes        | Pitman    | Neighbor     |       |
| 22               | Shruti     | Uchil     | Neighbor     |       |
| 23               | Maureen    | Schmitt   | Neighbor     |       |
| 24               | Fabrice    | Lacoste   | Neighbor     |       |
| 25               | Steven     | McNally   | Neighbor     |       |
| 26               | Felipe     | Ledesma   | Neighbor     |       |
| 27               | Pieter     | de Ridder | Neighbor     |       |

# Hackney PUD Rezoning: Virtual Neighborhood Notification Meeting

October 29, 2020 5:00pm-7:00pm

## Project Representatives:

- Brendie Vega
- Glenda Toppe
- Daniel Rauh
- Nick Antrilli
- Bryant Inge

## Meeting Slides:

- Welcome
- Vicinity Map
- Jurisdiction Map
- Current Zoning
- Floodplains Map
- Future Land Use Map
- Future Transportation Maps
- Conceptual Layout
- Schedule of Project

## Neighbor Questions:

Q: What does the MD-CZ zoning mean? Our house is within that so what does that mean for us?

A: Medium Density Conditional Zoning. Medium density residential zoning with specific conditions imparted on the land that are determined during the rezoning process. Your land is subject to the zoning conditions of the land.

Q: We live at 2800 Treeswing - what is happening with the piece of land behind us with the deer stand?

A: That is part of the rezoning parcels. Specific site features are not yet determined as we are early in the rezoning process.

Q: Is there any possibility the existing pond south of Hasse would be filled in?

A: It is too early to tell what features will be kept or modified on the site. There is no current intent to drain it.

Q: On the conceptual layout slide, are the lighter blue areas water retention ponds? If so, is it a city requirement that they would need to be fenced in for child safety?

A: There is no municipal requirement to fence these features.

Q: Will the 2 existing large ponds be accessible to the community?

A: It is too early to tell what the programming of the internal amenities will look like. Land will probably be turned over to the HOA.

Q: Where will the entrances be located on Olive Chapel Road? Will the road be widened?

A: The developer will be required to install ½ of the road widening as designated on the future transportation plan. The conceptual drawings show an early proposed entrance.

Q: When will a detailed road network and home layout be developed and available for review?

A: This will be up to the developers. If it happens soon, it would come out around the beginning of the year.

Q: (There were numerous questions concerning the internal connections within and throughout the site)

A: Using the Town of Apex Future Thoroughfare Map, we explained that the connections into and out of the site will be required to follow the transportation map. The conceptual layout demonstrated a conceptual internal roadway connection through the site.

Q: (There were multiple questions concerning when the project would begin.)

A: We expect the project to begin within 12 – 15 months, although this is dependent on many factors.

Q: I have a few questions. 1) is a builder planned yet. 2) We do not have a road ext sign on Water Tower Lane. We were told when we bought unless it was Lennar, other builders were not required to connect.

A: No builder planned yet. The developer generally will not have an impact on whether or not a road extension is provided. That is generally guided by the future transportation maps of the municipality.



Q: Will bordering communities have a say on the design of the community (location of Townhomes vs single family)?

A: Please reach out to us with your input and we will pass it along to the developer once one is identified.

Q: What are the construction hours in Apex.

A: 7:00am to 7:00pm during the normal work week. Weekends and holidays vary.

Q: What is going to happen to the trees in the lot?

A: There are no detailed plans for the site yet. There are certain environmental protection areas in place where trees will remain.

Q: There are some very old ok trees bordering hackney and Lennar preservation. Literally on the border. Greater than 50" diameter. Will these be preserved?

A: We are required to do a tree survey and protect trees above a certain caliper. Additionally, if the trees are located near the site border, then they should be protected.

Q: What elementary school would serve this community?

A: (Answered by another Neighbor) It's currently Olive Chapel (capped) followed by Salem (capped) and then Turner Creek.

Q: (There was a question concerning the western pond near Rowboat Road and future development.)

A: There is probably not going to be road or home development in that area, although there are no finalized plans at this time.

Q: Would perimeter buffers be maintained or would the development be opened up?

A: Buffers are required between neighborhoods.



## Neighborhood Comments:

C: Don't fill the ponds.

C: Like to Like: Single-family should be designed adjacent to existing single-family homes.

C: Support townhomes along proposed main thoroughfare.

# AFFIDAVIT OF CONDUCTING AN ELECTRONIC NEIGHBORHOOD MEETING AND ISSUES/RESPONSES SUBMITTAL

This document is a public record under the North Carolina Public Records Act and may be published on the Town's website or disclosed to third parties.

Brendie Vega

I, \_\_\_\_\_, do hereby declare as follows:

Print Name

1. I have conducted an Electronic Neighborhood Meeting for the proposed Rezoning, Major Site Plan, Residential Master Subdivision Plan, or Special Use Permit in accordance with UDO Sec. 2.2.7 *Neighborhood Meeting*.
2. The meeting invitations were mailed to the Apex Planning Department, all property owners within 300 feet of the subject property and any neighborhood association that represents citizens in the area via first class mail a minimum of 10 days in advance of the Electronic Neighborhood Meeting.
3. The meeting was conducted via WebEx (indicate format of meeting) on 10/29/2020 (date) from 5 pm (start time) to 7 pm (end time).
4. I have included the mailing list, meeting invitation, attendance sheet issue/response summary, and zoning map/reduced plans with the application.
5. I have prepared these materials in good faith and to the best of my ability.

11/02/2020

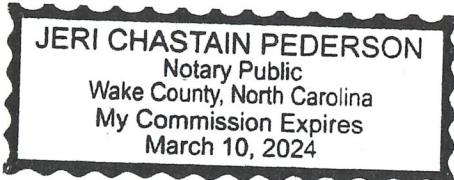
Date

By: Brendie Vega

STATE OF NORTH CAROLINA  
COUNTY OF WAKE

Sworn and subscribed before me, Jeri Chastain Pederson, a Notary Public for the above State and County, on this the 2 day of November, 2020.

SEAL



Jeri Chastain Pederson  
Notary Public

Jeri Chastain Pederson  
Print Name

My Commission Expires: 03/10/2024

# **PD PLAN**

## **Hackney Planned Unit Development**

**APEX, NORTH CAROLINA**

### **APPLICANT**

WithersRavenel

137 S Wilmington Street Suite 200

Raleigh, NC 27601

**Date: March 23, 2021**

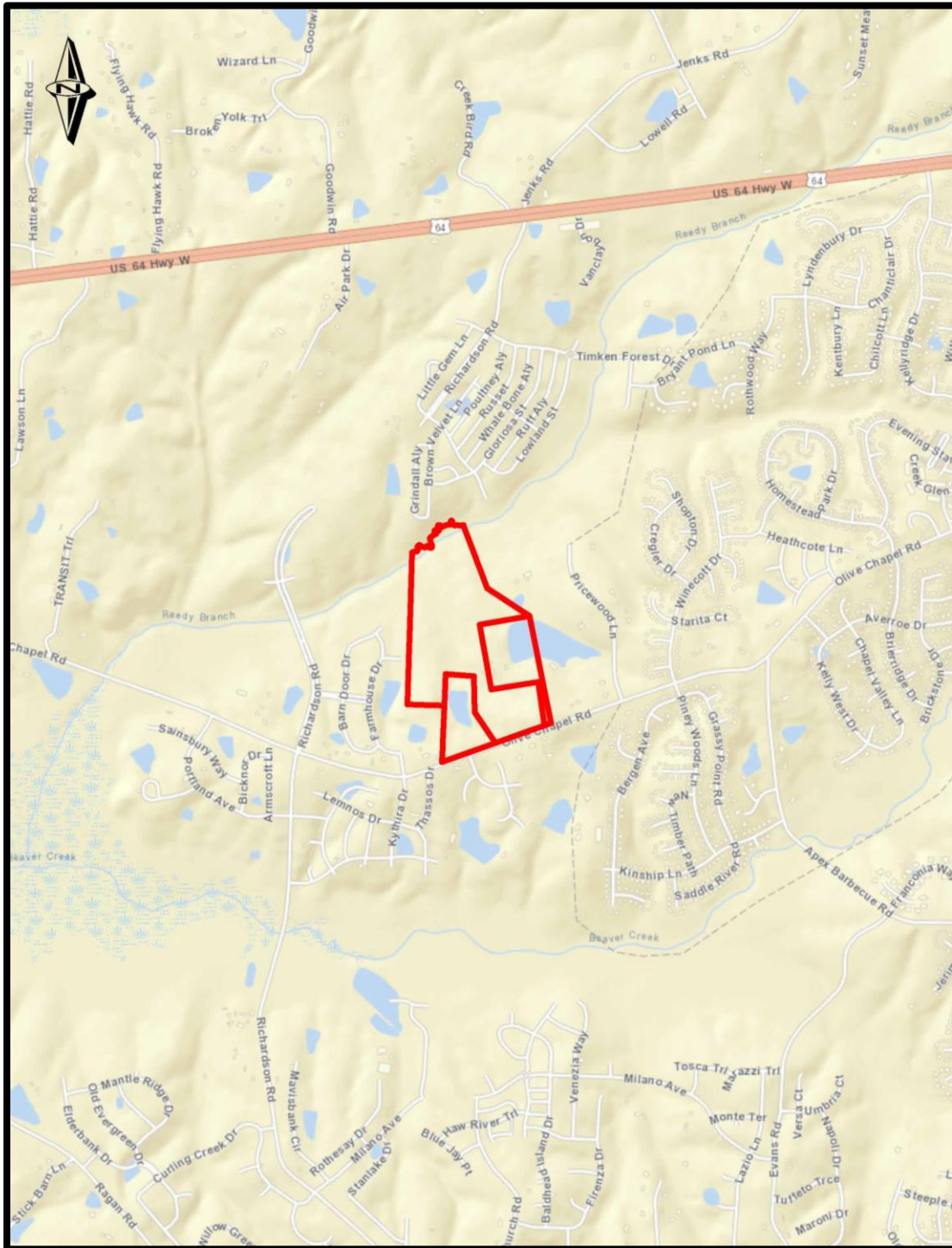


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## 1.0 VICINITY MAP



Project Parcels: Not to Scale

137 S Wilmington Street, Suite 200 | Raleigh, NC 27601

t: 919.469.3340 | f: 919.467.6008 | [www.withersravenel.com](http://www.withersravenel.com) | License No. C-0832

Asheville | Cary | Greensboro | Pittsboro | Raleigh | Wilmington

## 2.0 PROJECT DATA

|  |  |   |
|--|--|---|
| Name of Project                        | Hackney Planned Unit Development                 |   |
| PIN(s)                                 | 0721492629<br>0722406699<br>0722411102           |   |
| Preparer/Owner Information             | Prepared by                                      | WithersRavenel<br>137 S. Wilmington Street,<br>Suite 200<br>Raleigh, NC 27601<br>Phone: 919.469.3340<br>Fax: 919.467.6008<br>Email:<br>Brendie Vega, AICP, CNU-A<br><a href="mailto:bvega@withersravenel.com">bvega@withersravenel.com</a><br>Bryant Inge, PE<br><a href="mailto:binge@withersravenel.com">binge@withersravenel.com</a> |
|  | Owners   | Hackney, Charles Leon<br>Hackney, Judy G<br>Goodwin, Edwin A<br>2505 Olive Chapel Rd<br>Apex, NC 27502-6788   |
| Current Zoning Designation             | Rural Residential (RR) & Residential-80W (R-80W) |   |
| Proposed Zoning Designation            | Planned Unit Development (PUD-CZ)                |   |
| Current 2045 Land Use Map Designation  | Medium Density Residential                       |   |
| Proposed 2045 Land Use Map Designation | No Proposed Change (Medium Density)              |   |
| Area of Tracts (ac.)                   | 10.01, 11.91, & 57.87 (79.79 ac. total)          |   |

### 3.0 PROPOSED LIST OF USES

The Rezoned Lands may be used for, and only for, the uses listed immediately below. The permitted uses are subject to the limitations and regulations stated in the UDO and any additional limitations or regulations stated below. For convenience, some relevant sections of the UDO may be referenced; such references do not imply that other sections of the UDO do not apply.

#### **Residential**

- Single-Family
- Accessory Dwelling Unit
- Townhouse

#### **Non-Residential**

- Utility, Minor
- Greenway
- Park, Active
- Park, Passive

### 4.0 PURPOSE STATEMENT

The Hackney Planned Unit Development Conceptual Layout has been designed in order to help establish appropriately sized residential opportunities along Olive Chapel Road. Development is intended to reflect the neighboring residential communities in both density and product. This residential development philosophy is in line with the 2045 Apex Future Land Use Plan designation of “Medium Density Residential”. The site will provide a mixture of amenities and strategic infrastructure connections for future residents to navigate the community.



## 5.0 PROPOSED DESIGN AND ARCHITECTURAL CONTROLS

|  |   |                              |              |
|--|---|------------------------------|--------------|
| Maximum Densities (du/Acre)                                | 3.5 du/acre   |                              |              |
| Maximum Height of Buildings                                | 50 feet   |                              |              |
| Setbacks: Single-Family                                    | Front:<br>5' from façade<br>20' from garage to<br>back of sidewalk  | Side: 5'                     | Rear:<br>10' |
|  |   | Corner Side: 8'              |              |
| Setbacks: Townhouse, Front loaded                          | Front:<br>10' from façade<br>20' from garage to<br>back of sidewalk | Side: 5'                     | Rear:<br>10' |
|  |   | Building to<br>Building: 10' |              |
| Setbacks: Townhouse, Alley loaded                          | Front:<br>10' from façade   | Side: 5'                     | Rear:<br>5'  |
|  |   | Building to<br>Building: 10' |              |
| Amount and Percentage of Built<br>Upon Area Allowed        | 70%   |                              |              |
| Amount and Percentage of Proposed<br>Built Upon Area (Max) | 70%   |                              |              |

1. Vinyl siding is not permitted; however, vinyl windows, decorative elements and trim are permitted.
2. The roofline cannot be a single mass; it must be broken up horizontally and vertically between every unit.
3. Garage doors must have windows, decorative details or carriage-style adornments on them.
4. The rear and side elevations of the units that can be seen from the right-of-way shall have trim around the windows.

5. The visible side of a townhome on a corner lot facing the public street shall contain at least 2 decorative elements such as, but not limited to, the following elements:
- Windows
  - Bay window
  - Recessed window
  - Decorative window
  - Trim around the windows
  - Wrap-around porch or side porch
  - Two or more building materials
  - Decorative brick/stone
  - Decorative trim
  - Decorative shake
  - Decorative air vents on gables
  - Decorative gable
  - Decorative cornice
  - Column
  - Portico
  - Balcony
  - Dormer
6. The garage cannot protrude more than 1-foot from either the front façade or porch.

## 6.0 BUFFERS

Perimeter Buffers shall be designated as such:

|       |                     |
|-------|---------------------|
| North | 100' Stream Buffer* |
| East  | 20' Type A Buffer   |
| South | 30' Type E Buffer** |
| West  | 20' Type A Buffer   |

\* In addition to the 100' riparian buffer on the north, an additional 100' buffer will be established. This additional 100' may include utilities, trails and other active or passive recreation.

\*\*A 30' Type B Buffer shall be provided if homes along Olive Chapel Road are not alley-loaded.

## 7.0 NATURAL RESOURCES AND ENVIRONMENT

### **Watershed**

The Hackney Planned Unit Development is located within the Primary Watershed Protection Overlay District and is therefore subject to the requirements outlined in Section 6.1 of the Town of Apex Unified Development Ordinance.

### **Floodplain**

The parcels that make up the Site do contain a small portion of FEMA designated 100-year floodplains near the site's northern termination according to FEMA FIRM Panel 3720072200J, effective 05/02/2006.

### **Resource Conservation**

The Site is also subject to the Resource Conservation Area requirements outlined in the Town of Apex Unified Development Ordinance.

The PUD will meet the requirements of:

**8.1.2.C.1 Planned Developments.** The RCA for all planned developments shall be determined by the Town Council per Sec. 2.3.4.F.1.c and per Sec. 8.1.2.C.4, 5, 6, 7, or 10 as applicable.

**8.1.2.C.4 Development located south and west of NC 540.** All developments which do not meet the criteria of subsections 8.1.2.C.3 or 10 and which are located south and west of NC 540 shall provide buffers and RCA equal to or greater than 30% of the gross site acreage for single-family and townhome uses and 25% of the gross site acreage for multi-family, mixed-use, and non-residential uses.

Per UDO Section 7.2.5.B.8, if any mass grading is proposed in the single-family sections of the PUD, the following provision will apply to lot coverage area for single-family: An additional five percent (5%) Resource Conservation Area (RCA) shall be set aside. This requirement is added to the standard RCA percentage requirement found in Sec. 8.1.2.C Size of the RCA.

## **Tree Replanting**

Existing deciduous trees greater than 18” in diameter (DBH), as identified in the tree survey, that are removed by site development shall be replaced by planting a 1.5” caliper native tree from the Town of Apex Design and Development Manual as a street tree or as other required landscaping. Excess required tree replacement will occur in common open space areas.

## **Clean Energy**

Residential dwelling units will be provided with solar conduit to accommodate the future installation of solar panels.

## **Water Quality**

Signs will be installed near SCMs in order to:

1. Reduce pet waste near SCM drainage areas.
2. Reduce fertilizer near SCM drainage areas.

Installation of Pet Waste Stations in common areas will occur within the neighborhood.

## **Planting and Landscaping**

Install Warm Season grasses (Bermuda, Zoysia, etc) in lawn areas to reduce the need for irrigation and chemicals.

Install required Street Trees, Buffer and Re-Vegetation plantings that consist of a variety of native plant materials recognized by the New Hope Audubon Society or the NCSU manual for Landscaping for Wildlife with Native Plants as being bird and pollinator friendly; as allowed by the Town of Apex Design & Development Manual or approved by Apex Staff.

Specify pocket park plantings that are recognized by the NC Wildlife Federation as being Native Pollinator Plants as part of the Statewide Butterfly Highway initiative.

Include at least 4 native hardwood tree varieties in the proposed plantings, as allowed by the Apex Design and Development Manual.



## Environmental Resources

The site will provide the following:

1. Purchase 20 bird houses from the New Hope Audubon Society (or other non-profit) and install in natural areas within the site.
2. Retain the 2 existing ponds if engineering studies confirm that the existing dams are structurally sound and meet regulatory requirements.

## Historic Preservation

According to the North Carolina Historic Preservation Office's HPOWEB 2.0 Mapping application, there are no historic structures contained on the Site.

## 8.0 STORMWATER MANAGEMENT REQUIREMENTS

The parcels on which the development is proposed upon currently consist of a few existing structures, some cleared lands, and wooded lands. Two ponds exist on the parcels and drain to Reedy Branch Creek, eventually feeding into Jordan Lake. The proposed development plan will require stormwater management measures in accordance with Sections 6.1 and 7.5.7 in the Town of Apex Unified Development Ordinance. Stormwater captured on the site will be conveyed to proposed Stormwater Control Measures, which will be identified on plans during the major subdivision or site plan approval stage. Post-development peak runoff shall not exceed pre-development peak runoff for the 24-hour, 1-year and 10-year storm events in accordance with the Unified Development Ordinance. Treatment for the first 1-inch of runoff will be provided such that the removal of 85% Total Suspended Solids is achieved. All stormwater devices will meet the design requirements of NCDENR and the Town of Apex.

## 9.0 PARKS, RECREATION AND CULTURAL RESOURCES

The Apex Parks, Recreation and Cultural Resources Advisory Commission met on December 9, 2020 and unanimously recommended a fee-in-lieu of dedication with credit for construction of greenway which connects Sidepath along Hasse Ave to the west connecting to the Reedy Branch Greenway in Smith Farm. The fee rate will be set at the time of Town Council Review/ Approval and the credit for construction will be calculated prior to construction plan approval. Per the UDO Art 14, the greenway must be completed and accepted prior to 25% of the building permits for the project being issued.

## 10.0 PARKING AND LOADING

All parking provided on the Site will comply with the requirements outlined in Section 8.3 of the Town of Apex Unified Development Ordinance. Per 8.3.4(C) of the UDO, guest parking shall be designated within common areas and be distributed throughout residential projects. Striped on-street parking may be counted toward guest parking requirements. For Townhouse, guest parking shall be distributed so that there is at least one parking space within 200' of each townhouse lot.

## 11.0 SIGNAGE

All signage on the Site will comply with the requirements outlined in Section 8.7 of the Town of Apex Unified Development Ordinance.

## 12.0 PUBLIC FACILITIES REQUIREMENTS

**All utilities shall meet the Town of Apex Master Utility Maps.**

### **Sanitary Sewer Service**

All on-site sanitary sewer lines will be extended to the property lines to allow future interconnectivity of properties. The design of the sanitary sewer will be according to the Town of Apex Engineering Standards and Specifications while accounting for downstream capacity and future upstream development. Sanitary Sewer easements will be established for public sewer outside of the Public R/W.

## **Gas**

The Public Service Company of North Carolina (PSNC) will require a revenue analysis based on the proposed development in order to determine the applicable costs to the developer for installation of infrastructure.

## **Electric Service**

The Site is in the service area of both the Town of Apex Electric Utilities and Progress Energy and the applicant will select the Town of Apex to serve as the electric provider.

## **Roadways**

The Site will require an internal public roadway network and parking spaces. The onsite transportation circulation system shall be consistent with the Town of Apex Transportation Plan and the Town of Apex Standard Specifications and Standard Details and show required right-of-way widths and road sections.

Hasse Avenue will be constructed between Olive Chapel Road and its current terminus north of the project. Olive Chapel Road will be widened to include construction of a 100-foot eastbound left-turn lane with appropriate deceleration length and taper and a 100-foot westbound right-turn lane with appropriate deceleration length and taper subject to NCDOT review and approval. The Olive Chapel Road turn lane widening will be completed prior to platting Hasse Avenue access to Olive Chapel Road and the connection to Hasse Avenue north of the project will be completed prior to the last plat in the subdivision.

A 6-foot bike lane and 5-foot paved shoulder will be located on the north side of Olive Chapel Road per the bike/ped systems map.

Per the Long-Range Transportation Map, the following roadway sections apply to this development:

- Olive Chapel Road = 4-Lane with median, widening, 110' ROW, must provide 55' from centerline
- N/S = Future Major Collector, 60' ROW
- E/W = Future Local Connection, 50' ROW

There will be no private driveways permitted along Olive Chapel Road.

## **Alleys**

Alleys may be proposed to vary from Town standards in order to accommodate water and sewer utilities, provided they maintain the same or greater width of pavement and right of way, subject to staff review and approval at the time of subdivision and construction plans.

## **Water Service**

All on-site water lines will be designed according to Town of Apex Engineering Standards and Specifications.

## **Transit**

According to the Apex 2045 Transportation Plan, there are no existing or proposed transit routes designated on or adjacent to the Site.

## **Pedestrian Facilities**

The development plan will incorporate sidewalk infrastructure along Olive Chapel Road as well as the internal street network. A trail will serve as a connection from the western portion of the community to the Reedy Branch Greenway, thus in compliance with the future land use plan.

Sidewalks will be provided on both sides of all streets for single-family detached homes. There will be a 10-foot side path provided along minor collector roads as show on the bike/ped plan.

Prior to platting the 75th lot in the neighborhood, the Developer will extend a 5' sidewalk approximately 860 feet along the north side of Olive Chapel to the western limits of the Linden Subdivision. Developer will attempt to obtain the required right-of-way and/or easements for construction of this sidewalk from the adjacent property owners. If the required right-of-way and/or easements cannot be obtained by that time, a Fee-in-Lieu in the amount of 125% of the estimated cost of construction plus fair market value of the property to be acquired, shall be assessed. Any performance guarantee provided for this section of sidewalk shall be released upon acceptance of said fee-in-lieu by the Town.



## 13.0 PHASING PLAN

The Hackney Planned Unit Development will be constructed in phases according to economic considerations and infrastructure requirements.

Please note the following considerations for the phasing plan:

1. Access points are preliminary in nature and subject to Town of Apex and NCDOT review and approval.
2. Limits of land disturbance within each phase shall be determined at the master subdivision plan and site plan stages.
3. Public utilities shall be provided for each phase of development.

## 14.0 CONSISTENCY WITH 2045 LAND USE PLAN

The Apex 2045 Future Land Use Map depicts the future land use of the three parcels as Medium Density Residential. Medium Density Residential lands are described in the Land Use Plan as consisting of single-family homes, duplexes, and townhomes with densities between three (3) and seven (7) dwelling units per acre. It is intended to act as a transition between higher and lower residential densities. The maximum density proposed for the Hackney Planned Unit Development is four (4) dwelling units per acre.

The Hackney Planned Unit Development proposes medium density residential housing options appropriate to its proximity to the Olive Chapel Road thoroughfare and are consistent with uses found in the surrounding communities. The uses proposed for the site are directly in line with the uses stated in the 2045 Future Apex Land Use Plan thus the proposed rezoning is consistent with the Town's future plans for this area.

## 15.0 CONSISTENCY WITH UNIFIED DEVELOPMENT ORDINANCE

The proposed development is consistent with all applicable requirements of the Town of Apex Unified Development Ordinance.

## 16.0 ELEVATIONS

Elevations provided are representative of architecture, materials, and housing types. Final elevations submitted at Major Subdivision Plan will meet the requirements of the Architectural Controls in 5.0 of this PD Plan.

## 17.0 AFFORDABLE HOUSING

If the Town of Apex has a fund or other mechanism in place to receive donations to construct, subsidize, or participate in the development of affordable housing units (the “Fund”), the developer will contribute \$215 per lot to this Fund prior to the first residential Certificate of Occupancy. In the event the Fund has not been established by the Town of Apex, the money will be conveyed to a local non-profit working on affordable housing initiatives. The developer will work with the Town of Apex to identify a mutually acceptable local non-profit organization to receive these funds.



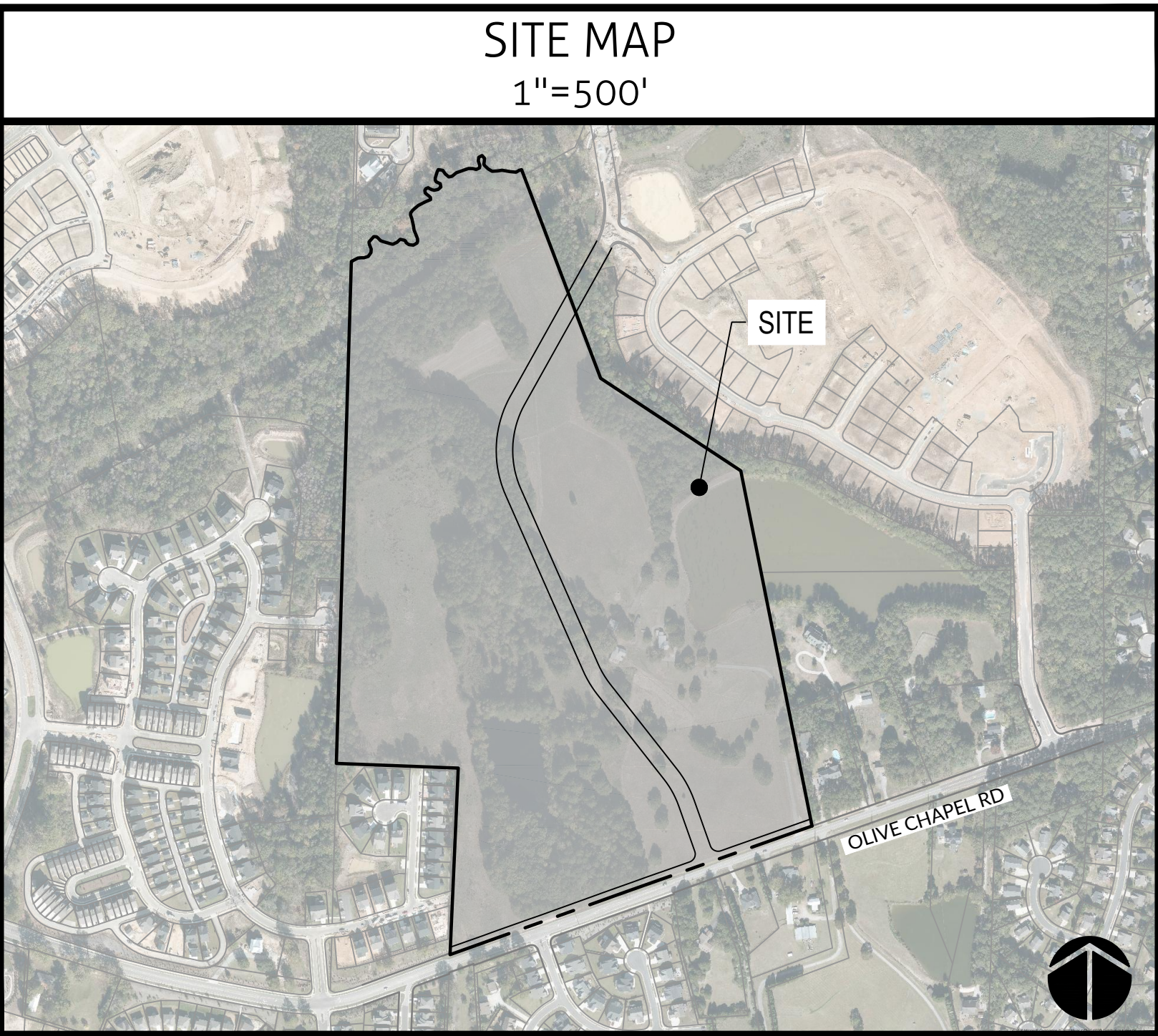
# PLANNED UNIT DEVELOPMENT

# HACKNEY

## APEX, NORTH CAROLINA

MARCH 23, 2021

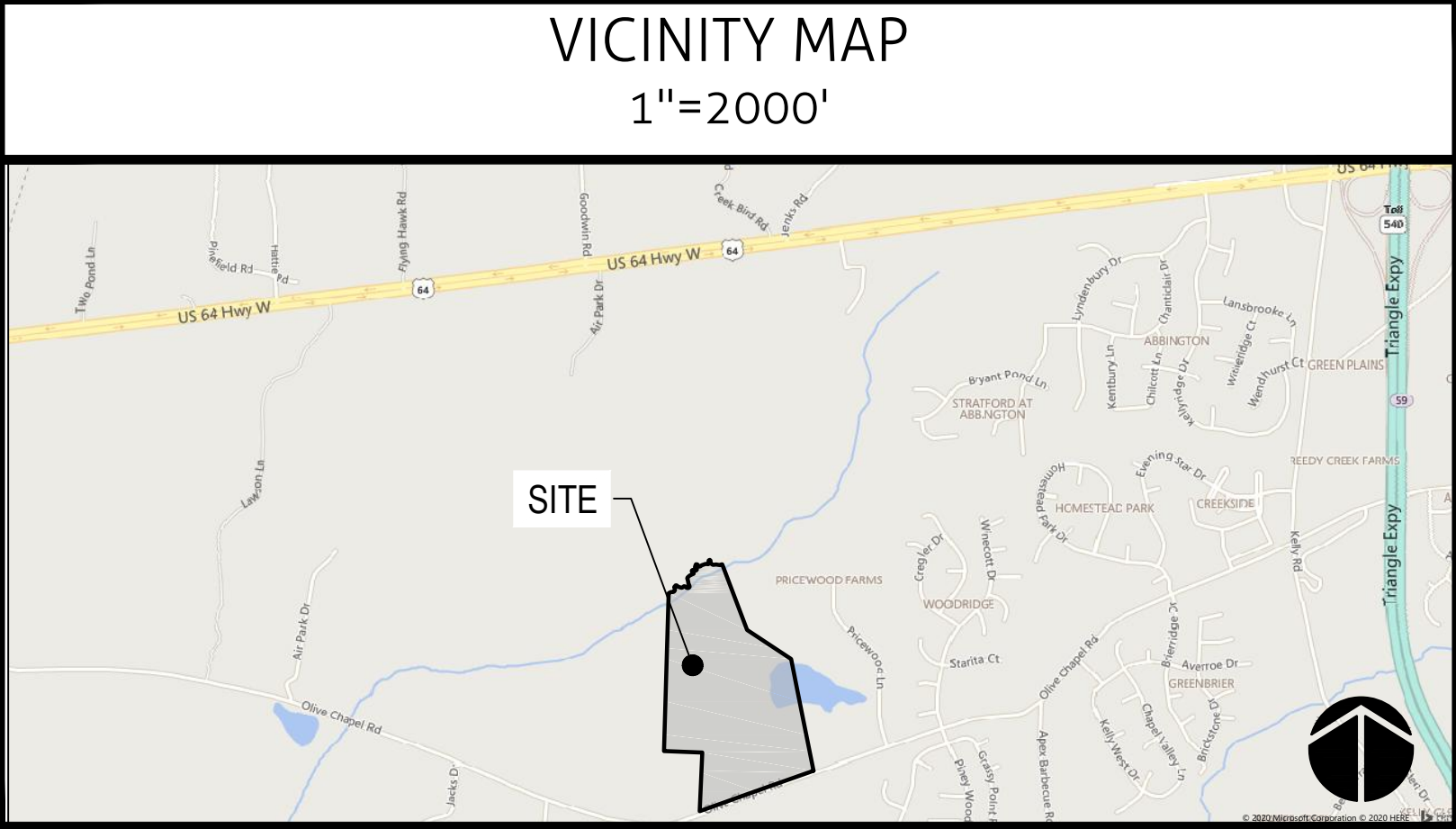
| SITE DATA   |   |   |
|---|---|---|
| 2045 LAND USE PLAN DESIGNATION  | CURRENT   | MEDIUM DENSITY RESIDENTIAL  |
|   | PROPOSED  | NO CHANGE   |
| ZONING  | CURRENT   | RURAL RESIDENTIAL (RR) (R-80W)  |
|   | PROPOSED  | PLANNED UNIT DEVELOPMENT (PUD-CZ)   |
| AREA OF TRACTS IN PROPOSED PUD  | 0722-41-1102  | 57.87 ACRES   |
|   | 0721-49-2629  | 10.91 ACRES   |
|   | 0722-40-6699  | 11.91 ACRES   |
|   | TOTAL:  | 79.79 ACRES   |
| AREA DESIGNATED AS MIXED-USE ON 2045 LAND USE MAP                     | 0 ACRES   |   |
| AREA OF MIXED-USE PROPERTY PROPOSED AS NON-RESIDENTIAL DEVELOPMENT    | N/A   |   |
| PERCENT OF MIXED-USE PROPERTY PROPOSED AS NON-RESIDENTIAL DEVELOPMENT | N/A   |   |
| REQUESTED SEWER CAPACITY  | TO BE DETERMINED  |   |
| MAXIMUM RESIDENTIAL DENSITY   | 3.5 DU/ACRE   |   |
| MAXIMUM BUILDING HEIGHT   | 50'-0"  |   |
| SETBACKS: SINGLE FAMILY   | FRONT: 5 FT FROM FACADE<br>20 FT FROM GARAGE TO BACK OF SIDEWALK  | REAR: 10 FT<br>SIDE: 5 FT<br>CORNER SIDE: 8 FT  |
| SETBACKS: TOWNHOUSE, FRONT LOADED                                     | FRONT: 10 FT FROM FACADE<br>20 FT FROM GARAGE TO BACK OF SIDEWALK | REAR: 10 FT<br>SIDE: 5 FT<br>BUILDING TO BUILDING: 10 FT  |
| SETBACKS: TOWNHOUSE, ALLEY LOADED                                     | FRONT: 10 FT FROM FACADE  | REAR: 5 FT<br>SIDE: 5 FT<br>BUILDING TO BUILDING: 10 FT   |
| WATERSHED   | JORDAN LAKE WATERSHED, PRIMARY WATERSHED PROTECTION OVERLAY       |   |
| HISTORIC STRUCTURES   | N/A   |   |
| COMMUNITY AMENITIES   | COMMUNITY GATHERING SPACE WITH BENCHES, TOT LOT                   |   |
| SITE BUFFERS  | NORTH   | 100' RIPARIAN BUFFER<br>*IN ADDITION TO THE 100' RIPARIAN BUFFER ON THE NORTH, AN ADDITIONAL 100' BUFFER WILL BE ESTABLISHED. THIS ADDITIONAL 100' MAY INCLUDE UTILITIES, TRAILS, AND OTHER ACTIVE OR PASSIVE RECREATION. |
|   | EAST  | 20' TYPE A BUFFER   |
|   | SOUTH   | 30' TYPE E BUFFER<br>*A 30' TYPE B BUFFER SHALL BE PROVIDED IF HOMES ALONG OLIVE CHAPEL ROAD ARE NOT ALLEY LOADED.  |
|   | WEST  | 20' TYPE A BUFFER   |



| INDEX OF SHEETS |                                       |
|-----------------|---------------------------------------|
| SHEET NUMBER    | SHEET TITLE                           |
| 0.0             | COVER                                 |
| 1.0             | EXISTING CONDITIONS                   |
| 2.0             | CONCEPTUAL LAYOUT PLAN                |
| 3.0             | CONCEPTUAL UTILITY PLAN               |
| 4.0             | CONCEPTUAL STORMWATER MANAGEMENT PLAN |

### ZONING CONDITIONS

- THE APEX PARKS, RECREATION AND CULTURAL RESOURCES ADVISORY COMMISSION MET ON DECEMBER 9, 2020 AND UNANIMOUSLY RECOMMENDED A FEE-IN-LIEU OF DEDICATION WITH CREDIT FOR CONSTRUCTION OF GREENWAY WHICH CONNECTS SIDEPATH ALONG HASSE AVE TO THE WEST CONNECTING TO THE REEDY BRANCH GREENWAY IN SMITH FARM. THE FEE RATE WILL BE SET AT THE TIME OF TOWN COUNCIL REVIEW/APPROVAL AND THE CREDIT FOR CONSTRUCTION WILL BE CALCULATED PRIOR TO CONSTRUCTION PLAN APPROVAL. PER THE LUDO ART 14, THE GREENWAY MUST BE COMPLETED AND ACCEPTED PRIOR TO 25% OF THE BUILDING PERMITS FOR THE PROJECT BEING ISSUED.
- HASSE AVENUE WILL BE CONSTRUCTED BETWEEN OLIVE CHAPEL ROAD AND ITS CURRENT TERMINUS NORTH OF THE PROJECT. OLIVE CHAPEL ROAD WILL BE WIDENED TO INCLUDE CONSTRUCTION OF A 100-FOOT EASTBOUND LEFT-TURN LANE WITH APPROPRIATE DECELERATION LENGTH AND TAPER AND A 100-FOOT WESTBOUND RIGHT-TURN LANE WITH APPROPRIATE DECELERATION LENGTH AND TAPER SUBJECT TO NOCOT REVIEW AND APPROVAL. THE OLIVE CHAPEL ROAD TURN LANE WIDENING WILL BE COMPLETED PRIOR TO PLATTING HASSE AVENUE ACCESS TO OLIVE CHAPEL ROAD AND THE CONNECTION TO HASSE AVENUE NORTH OF THE PROJECT WILL BE COMPLETED PRIOR TO THE LAST PLAT IN THE SUBDIVISION.
- THERE WILL BE NO PRIVATE DRIVEWAYS ALONG OLIVE CHAPEL ROAD.
- ALLEYS MAY BE PROPOSED TO VARY FROM TOWN STANDARDS IN ORDER TO ACCOMMODATE WATER AND SEWER UTILITIES, PROVIDED THEY MAINTAIN THE SAME OR GREATER WIDTH OF PAVEMENT AND RIGHT-OF-WAY. SUBJECT TO STAFF REVIEW AND APPROVAL AT THE TIME OF SUBDIVISION AND CONSTRUCTION PLANS.
- PRIOR TO PLATTING THE 75' LOT IN THE NEIGHBORHOOD, THE DEVELOPER WILL EXTEND A 5' SIDEWALK APPROXIMATELY 880 FEET ALONG THE NORTH SIDE OF OLIVE CHAPEL TO THE WESTERN LIMITS OF THE LINDEN SUBDIVISION. THE DEVELOPER WILL ATTEMPT TO OBTAIN THE REQUIRED RIGHT-OF-WAY AND/OR EASEMENTS FOR CONSTRUCTION OF THIS SIDEWALK FROM THE ADJACENT PROPERTY OWNERS. IF THE REQUIRED RIGHT-OF-WAY AND/OR EASEMENTS CANNOT BE OBTAINED BY THAT TIME, A FEE-IN-LIEU IN THE AMOUNT OF 125% OF THE ESTIMATED COST OF CONSTRUCTION PLUS FAIR MARKET VALUE OF THE PROPERTY TO BE ACQUIRED, SHALL BE ASSESSED. ANY PERFORMANCE GUARANTEE PROVIDED FOR THIS SECTION OF SIDEWALK SHALL BE RELEASED UPON ACCEPTANCE OF SAID FEE-IN-LIEU BY THE TOWN.



PREPARED BY:



115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

PLANNER: BRENDIE VEGA, AICP  
BVEGA@WITHERSRAVENEL.COM

CIVIL ENGINEER: BRYANT INGE, PE  
BINGE@WITHERSRAVENEL.COM

PRELIMINARY  
NOT APPROVED FOR  
CONSTRUCTION



- EXISTING CONDITION NOTES**
1. TOPOGRAPHIC AND UTILITY INFORMATION BASED ON AVAILABLE GIS MAPPING. PRELIMINARY BOUNDARY SURVEY PREPARED BY WITHERSRAVENEL DATED 09/25/20.
  2. WETLAND/STREAM INFORMATION BASED ON EVALUATION BY SAEC DATED 09/18/20 (APEX 20-004).
  3. REGULATORY FEMA MAPPED FLOODPLAINS EXIST ON SITE PER FIRM MAP #37007200J (5/20/6).
  4. THE SUBJECT PROPERTY IS LOCATED WITHIN THE TOWN OF APEX PRIMARY WATERSHED PROTECTION OVERLAY DISTRICT.
  5. ALL EXISTING STRUCTURES ON THE SUBJECT PROPERTY SHALL BE REMOVED PER TOWN OF APEX STANDARDS AND REQUIREMENTS.



**TREE LEGEND**

- OAK
- POPLAR
- GUM
- MAPLE
- CEDAR
- PINE

**EXISTING DECIDUOUS TREES TO BE REMOVED (>18" DBH)**

| TYPE         | QUANTITY  |
|--------------|-----------|
| OAK          | 46        |
| POPLAR       | 22        |
| GUM          | 17        |
| MAPLE        | 5         |
| <b>TOTAL</b> | <b>90</b> |

| No. | Revision | Date | By |
|-----|----------|------|----|
|     |          |      |    |
|     |          |      |    |
|     |          |      |    |

|            |    |         |             |
|------------|----|---------|-------------|
| Designer   | WR | Scale   | 1" = 100'   |
| Drawn By   | WR | Date    | 02/26/2021  |
| Checked By | WR | Job No. | 02180517.20 |

**HACKNEY**  
WAKE COUNTY NORTH CAROLINA

**EXISTING CONDITIONS**

**PRELIMINARY NOT APPROVED FOR CONSTRUCTION**

Sheet No. **1.0**

WithersRavenel  
Engineers | Planners | Surveyors  
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | f: 919.469.3340 | www.withersravenel.com

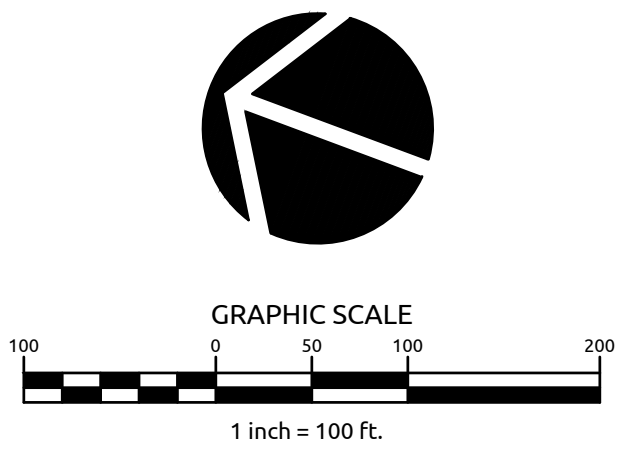


- NOTES:**
1. PLAN SHEETS ARE INTENDED FOR ILLUSTRATIVE USE ONLY.
  2. PER 2.3.4(F)(1)(A)(IV) OF THE UDO, SIDEWALKS MUST BE PROVIDED ON BOTH SIDES OF ALL STREETS FOR SINGLE-FAMILY DETACHED HOMES IN PUD-CZ DEVELOPMENT DISTRICTS.
  3. PER 2.3.4(F)(1)(F)(II) OF THE UDO, THE PD PLAN FOR PUD-CZ SHALL DEMONSTRATE A SAFE AND ADEQUATE ON-SITE TRANSPORTATION CIRCULATION SYSTEM. THE ON-SITE TRANSPORTATION CIRCULATION SYSTEM SHALL BE INTEGRATED WITH THE OFF-SITE TRANSPORTATION CIRCULATION SYSTEM OF THE TOWN. THE PD PLAN FOR PUD-CZ SHALL BE CONSISTENT WITH THE APEX TRANSPORTATION PLAN AND THE TOWN OF APEX STANDARD SPECIFICATIONS AND STANDARD DETAILS AND SHOW REQUIRED RIGHT-OF-WAY WIDTHS AND ROAD SECTIONS.
  4. PER UDO SECTION 7.2.5.B.8, IF ANY MASS GRADING IS PROPOSED IN THE SINGLE-FAMILY SECTIONS OF THE PUD, THE FOLLOWING PROVISION WILL APPLY TO LOT COVERAGE AREA FOR SINGLE-FAMILY: AN ADDITIONAL FIVE PERCENT (5%) RESOURCE CONSERVATION AREA (RCA) SHALL BE SET ASIDE. THIS REQUIREMENT IS ADDED TO THE STANDARD RCA PERCENTAGE REQUIREMENT FOUND IN SEC. 8.1.2.C SIZE OF THE RCA.
  5. COLLECTOR ROAD ALIGNMENT LOCATION WILL BE DETERMINED AT THE MAJOR SUBDIVISION PLAN STAGE.
  6. EXISTING PONDS WILL BE EVALUATED BY A LICENSED ENGINEER. EVALUATION RECOMMENDATIONS MAY REQUIRE A CHANGE TO SIZE, BOUNDARY OR REMOVAL OF EXISTING PONDS.
  7. A 30' TYPE B SHALL BE PROVIDED IF HOMES ALONG OLIVE CHAPEL ROAD ARE NOT ALLEY LOADED.



**LEGEND**

|  |                  |  |                     |
|--|------------------|--|---------------------|
|  | RESIDENTIAL      |  | ROADWAY CONNECTION  |
|  | STREAM           |  | GREENWAY CONNECTION |
|  | STREAM BUFFER    |  |                     |
|  | PERIMETER BUFFER |  |                     |
|  | STREETSCAPE      |  |                     |
|  | EXISTING POND    |  |                     |
|  | S.C.M.           |  |                     |
|  | WETLAND          |  |                     |



| No. | Revision | Date | By | Designer | Scale               |
|-----|----------|------|----|----------|---------------------|
|     |          |      |    | WR       | 1" = 100'           |
|     |          |      |    | WR       | Date 02/26/2021     |
|     |          |      |    | WR       | Job No. 02180517.20 |

**HACKNEY**  
WAKE COUNTY NORTH CAROLINA

**CONCEPTUAL LAYOUT PLAN**

**WithersRavenel**  
Engineers | Planners | Surveyors

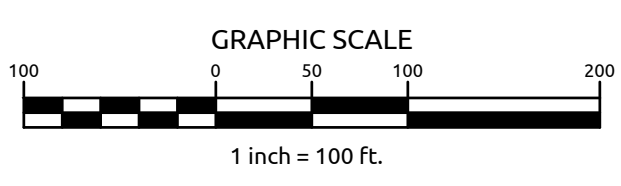
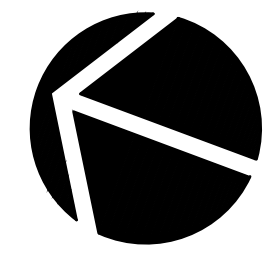
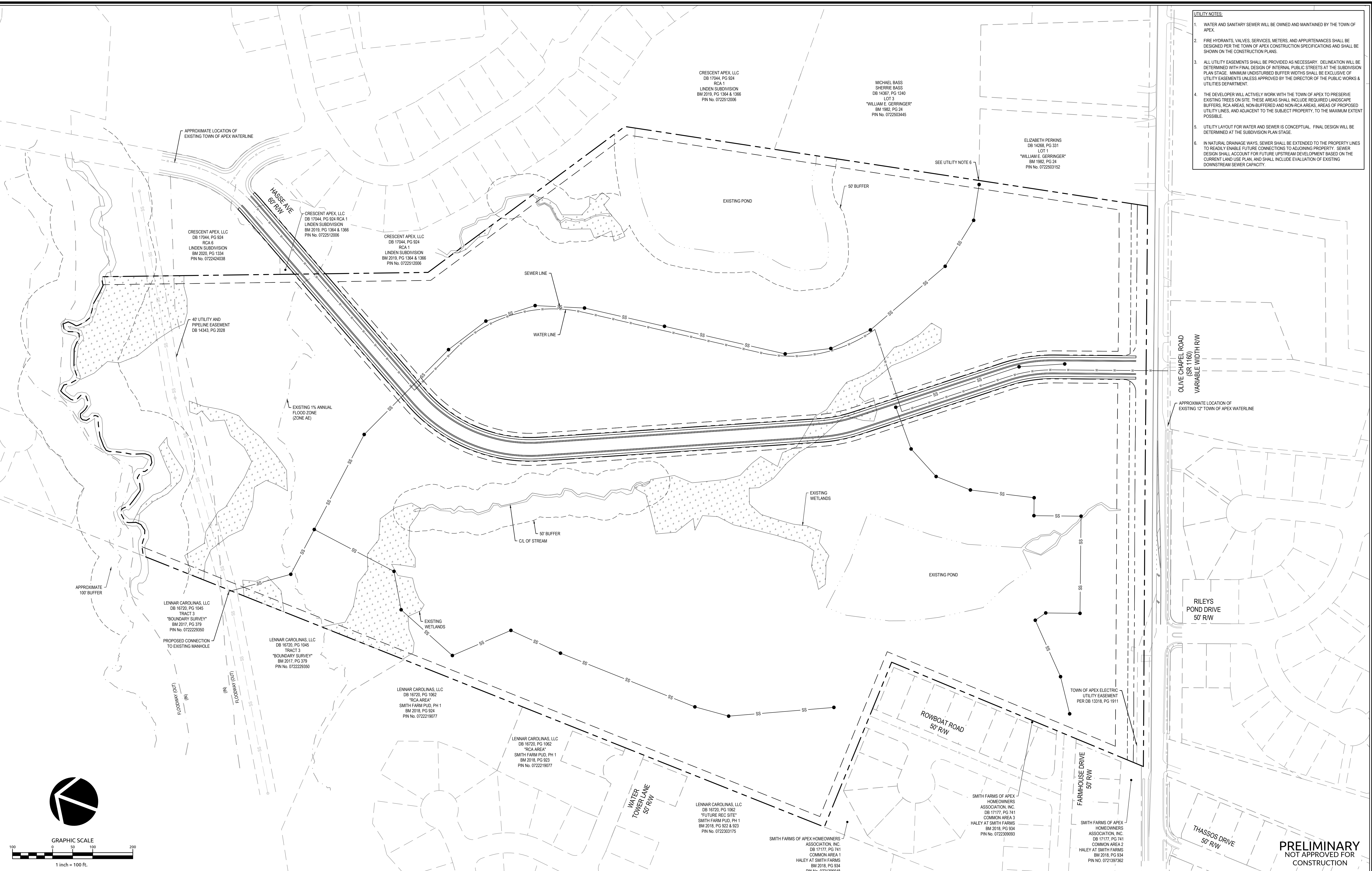
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Sheet No.  
**2.0**

K:\18180517\18180517\_20\Hackney\_Plan\AP02\02180517\_20\CONCEPT LAYOUT PLAN.dwg, Friday, February 26, 2021 10:31:31 AM, INZL, BRYANT



- UTILITY NOTES:**
1. WATER AND SANITARY SEWER WILL BE OWNED AND MAINTAINED BY THE TOWN OF APEX.
  2. FIRE HYDRANTS, VALVES, SERVICES, METERS, AND APPURTENANCES SHALL BE DESIGNED PER THE TOWN OF APEX CONSTRUCTION SPECIFICATIONS AND SHALL BE SHOWN ON THE CONSTRUCTION PLANS.
  3. ALL UTILITY EASEMENTS SHALL BE PROVIDED AS NECESSARY. DELINEATION WILL BE DETERMINED WITH FINAL DESIGN OF INTERNAL PUBLIC STREETS AT THE SUBDIVISION PLAN STAGE. MINIMUM UNDISTURBED BUFFER WIDTHS SHALL BE EXCLUSIVE OF UTILITY EASEMENTS UNLESS APPROVED BY THE DIRECTOR OF THE PUBLIC WORKS & UTILITIES DEPARTMENT.
  4. THE DEVELOPER WILL ACTIVELY WORK WITH THE TOWN OF APEX TO PRESERVE EXISTING TREES ON SITE. THESE AREAS SHALL INCLUDE REQUIRED LANDSCAPE BUFFERS, RCA AREAS, NON-BUFFERED AND NON-RCA AREAS, AREAS OF PROPOSED UTILITY LINES, AND ADJACENT TO THE SUBJECT PROPERTY, TO THE MAXIMUM EXTENT POSSIBLE.
  5. UTILITY LAYOUT FOR WATER AND SEWER IS CONCEPTUAL. FINAL DESIGN WILL BE DETERMINED AT THE SUBDIVISION PLAN STAGE.
  6. IN NATURAL DRAINAGE WAYS, SEWER SHALL BE EXTENDED TO THE PROPERTY LINES TO READILY ENABLE FUTURE CONNECTIONS TO ADJOINING PROPERTY. SEWER DESIGN SHALL ACCOUNT FOR FUTURE UPSTREAM DEVELOPMENT BASED ON THE CURRENT LAND USE PLAN, AND SHALL INCLUDE EVALUATION OF EXISTING DOWNSTREAM SEWER CAPACITY.



| No. | Revision | Date | By |
|-----|----------|------|----|
|     |          |      |    |
|     |          |      |    |
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|------------|----|---------|-------------|
| Designer   | WR | Scale   | 1" = 100'   |
| Drawn By   | WR | Date    | 02/26/2021  |
| Checked By | WR | Job No. | 02180517.20 |

**HACKNEY**  
WAKE COUNTY  
NORTH CAROLINA

## CONCEPTUAL UTILITY PLAN

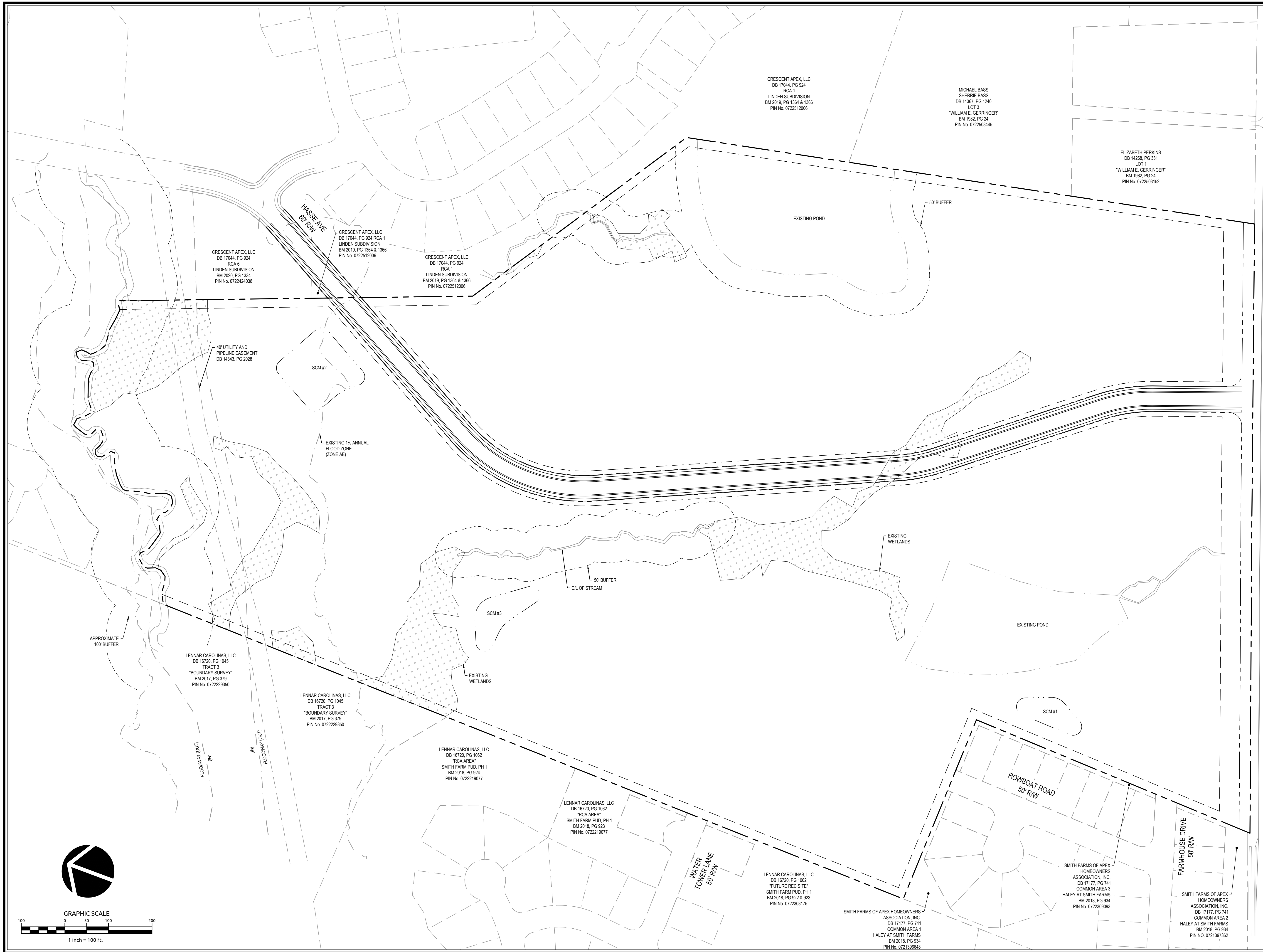
**WithersRavenel**  
Engineers | Planners | Surveyors  
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No.  
**3.0**

**PRELIMINARY**  
NOT APPROVED FOR  
CONSTRUCTION

K:\18180517\18180517\_20\Hackney\_Plan\ACAD\Drawings\Submittals\PRELIMINARY\UTILITY PLAN.dwg, Friday, February 26, 2021, 10:31:41 AM, INGLE, IRVING

- STORMWATER MANAGEMENT NOTES:**
1. TOPOGRAPHIC AND UTILITY INFORMATION BASED ON AVAILABLE GIS MAPPING. PRELIMINARY BOUNDARY SURVEY PREPARED BY WITHERSRAVENEL.
  2. WETLAND/STREAM INFORMATION BASED ON EVALUATION BY S&EC DATED 09/18/20.
  3. REGULATORY FEMA MAPPED FLOODPLAINS EXIST ON SITE PER FIRM MAP #372072200J (5/2/06).
  4. THE SUBJECT PROPERTY IS LOCATED WITHIN THE TOWN OF APEX PRIMARY WATERSHED PROTECTION OVERLAY DISTRICT.
  5. STORMWATER MANAGEMENT FACILITIES SHALL BE DESIGNED PER THE TOWN OF APEX STANDARDS AND REGULATIONS FOR STORMWATER QUANTITY AND QUALITY (UDO SECTION 6.1.7 B).
  6. ALL APPLICABLE LOCAL AND STATE ENVIRONMENTAL PERMITS SHALL BE OBTAINED PRIOR TO START OF CONSTRUCTION.
  7. STORMWATER TREATMENT WILL BE HANDLED BY INDIVIDUAL OR REGIONAL FACILITIES WITHIN THE SUBJECT PROPERTY OR ADJACENT OFF-SITE DRAINAGE EASEMENT.
  8. THE POST DEVELOPMENT PEAK FLOW RATE OF ON-SITE STORMWATER WILL NOT EXCEED THE PRE-DEVELOPMENT PEAK FLOW RATE IN ACCORDANCE WITH THE UDO.

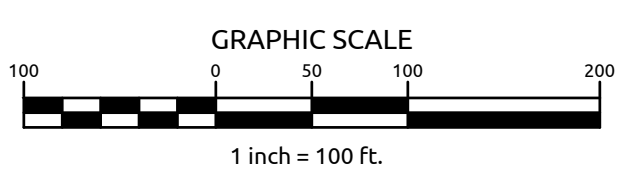
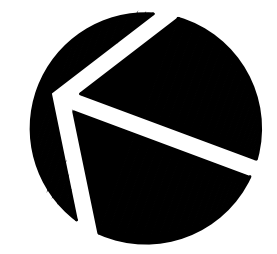


OLIVE CHAPEL ROAD  
(SR 1160)  
VARIABLE WIDTH ROW

RILEYS POND DRIVE  
50' RW

THASSOS DRIVE  
50' RW

**PRELIMINARY  
NOT APPROVED FOR  
CONSTRUCTION**



K:\18180517\18180517\_20\hcnw\18180517\_20\stormwater\MANAGEMENT PLAN.dwg, Friday, February 26, 2022 11:32:15 AM, JINZE, BRYANT

| No. | Revision | Date | By |
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| Designer   | WR | Scale   | 1" = 100'   |
| Drawn By   | WR | Date    | 02/26/2021  |
| Checked By | WR | Job No. | 02180517.20 |

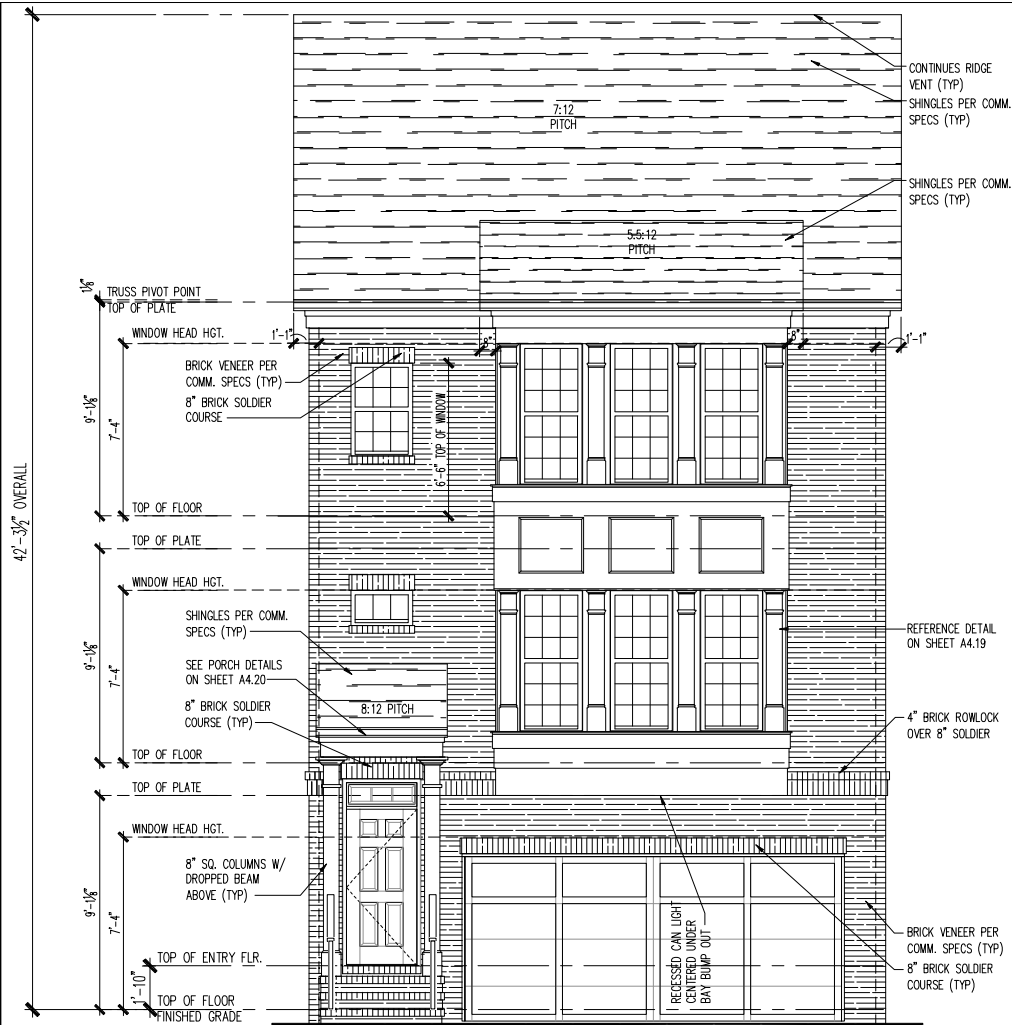
**HACKNEY**  
WAKE COUNTY  
NORTH CAROLINA

**CONCEPTUAL STORMWATER MANAGEMENT PLAN**

**WithersRavenel**  
Engineers | Planners | Surveyors  
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

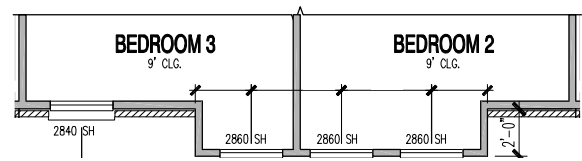
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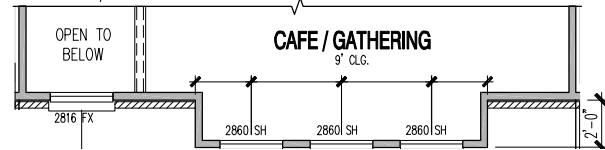
**ELEVATION 64**

SCALE: 1/4" = 1'-0"



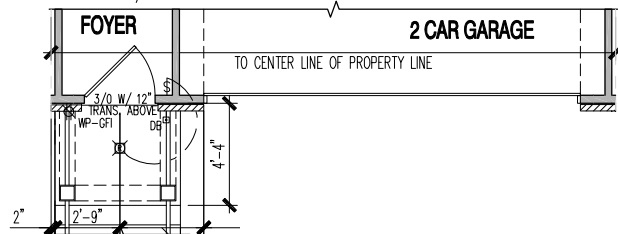
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



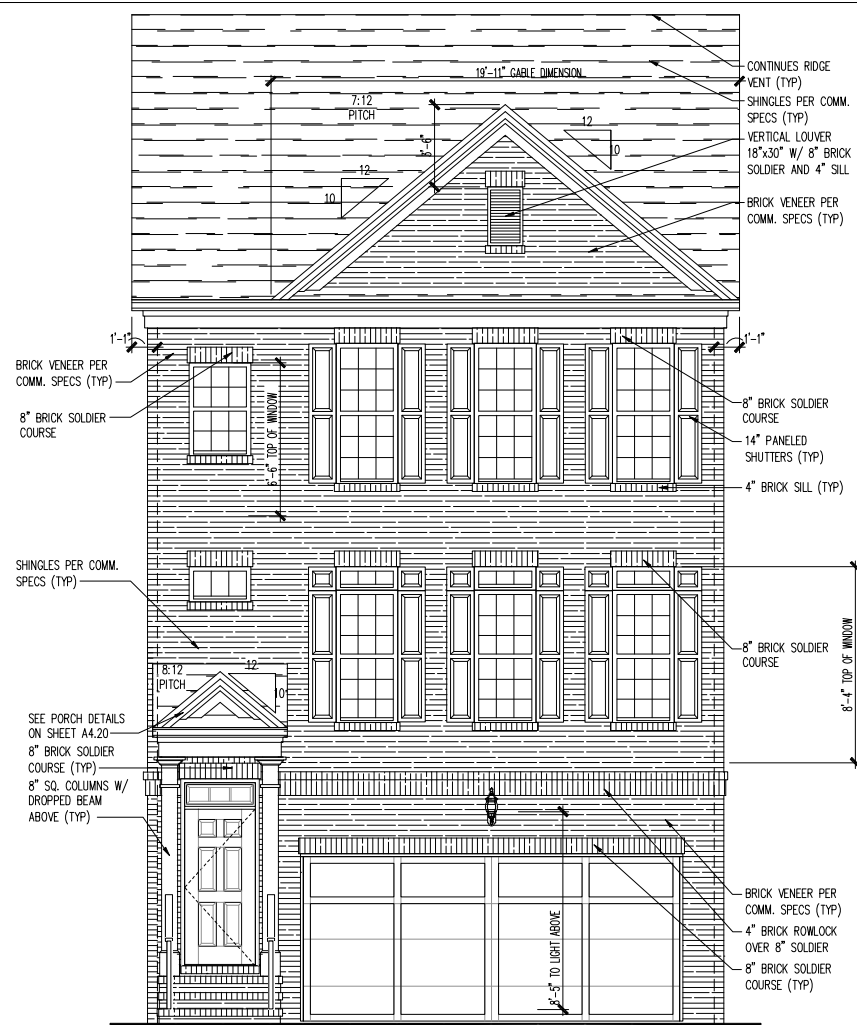
**SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



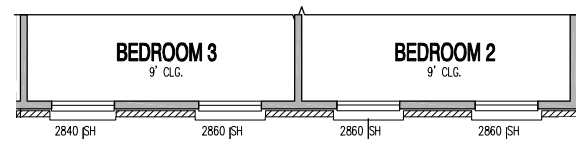
**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"



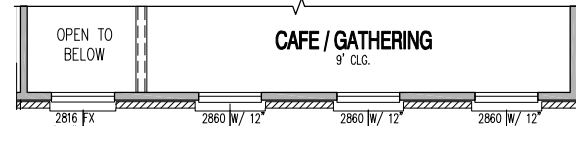
**ELEVATION 65**

SCALE: 1/4" = 1'-0"



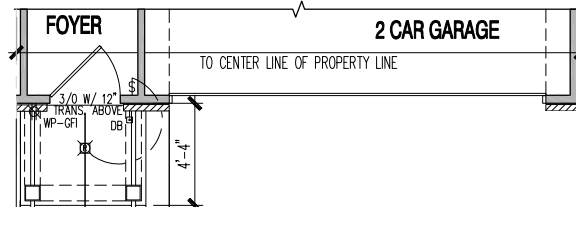
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



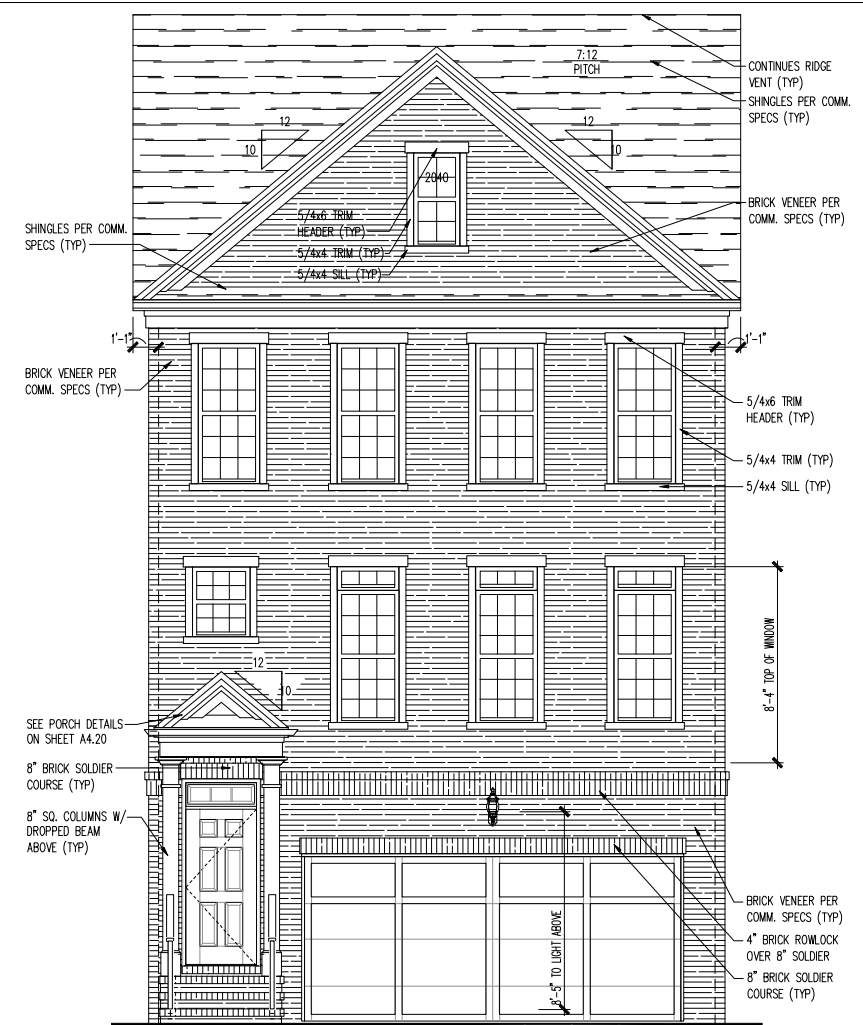
**SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



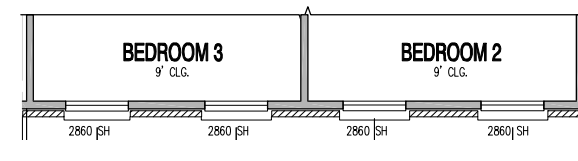
**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"



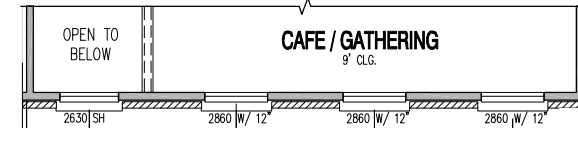
**ELEVATION 66**

SCALE: 1/4" = 1'-0"



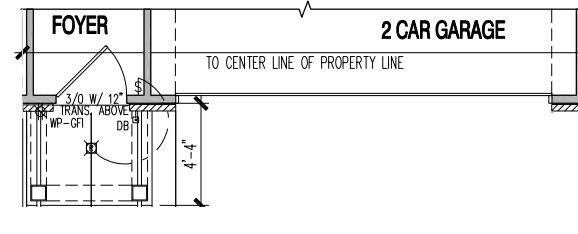
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



**SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"

RELEASED FOR CONSTRUCTION

**Building Elevations  
& Floor Plan Partials**  
Units 64, 65 & 66

PRODUCTION MANAGER  
Don Kostka  
INITIAL RELEASE DATE:  
12-08-2015  
CURRENT RELEASE DATE:  
12-08-2015

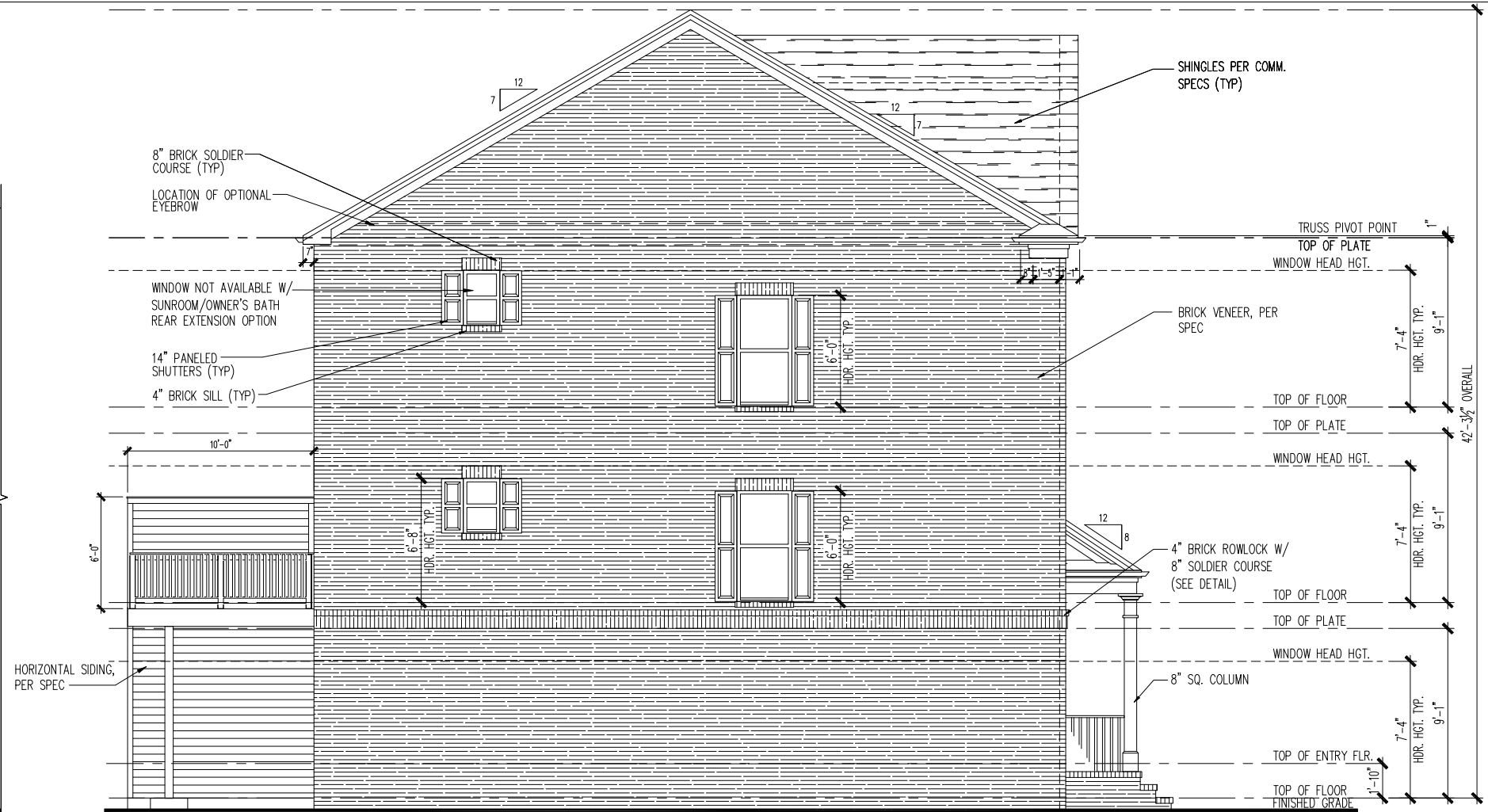
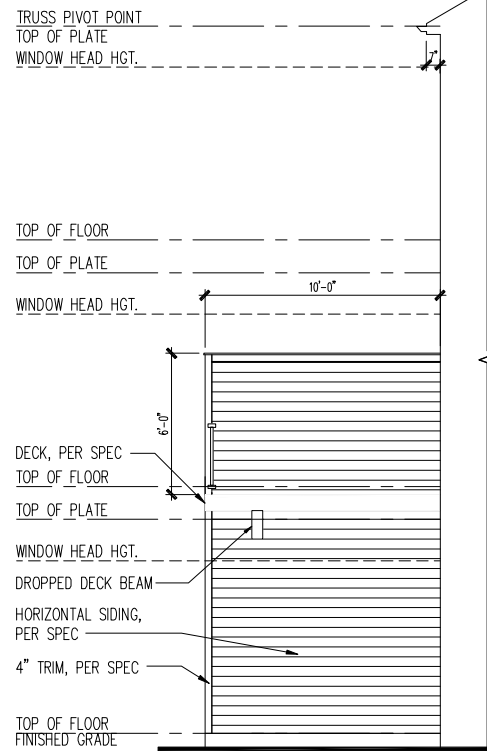
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GARAGE HANDING  
**FL-GE-ME-KC-KR**

PLAN NAME  
Summerford & Hutton  
NPS PLAN NUMBER  
**2468.928 - 2468.929**  
LAWSON PLAN ID

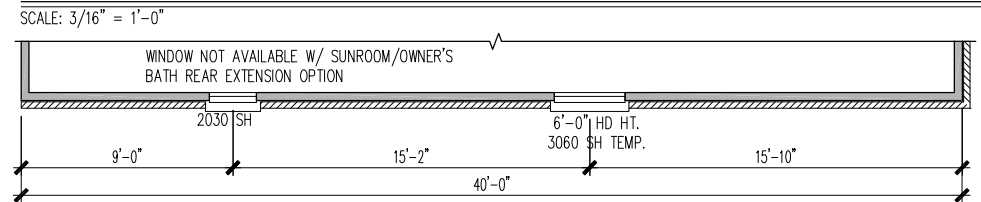
Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.



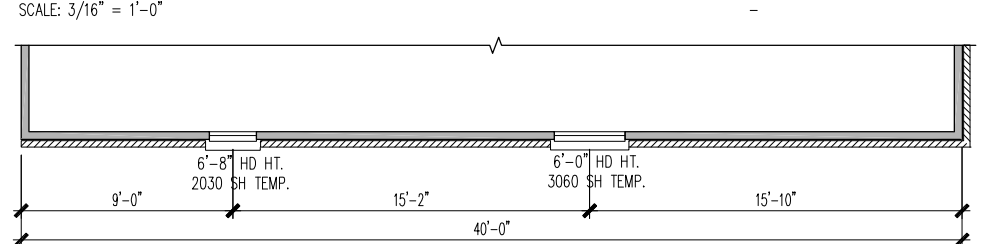


**LEFT ELEVATION - DECK 3 OPTION - MIDDLE CONDITION**  
SCALE: 3/16" = 1'-0" SEE BUILDING CONTROL PLANS FOR MORE INFORMATION

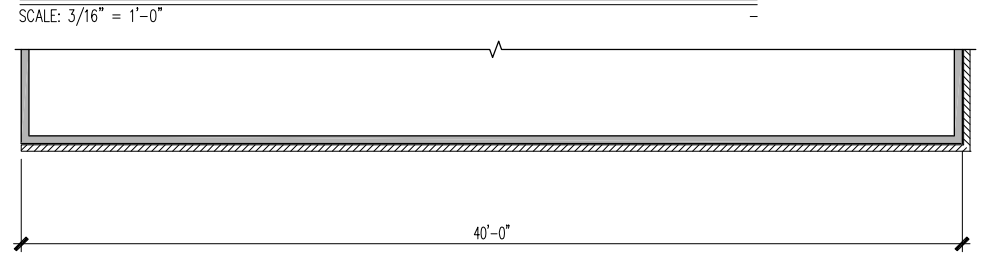
**LEFT ELEVATION '61- 70'**  
SCALE: 3/16" = 1'-0"



**THIRD FLOOR PARTIAL - SIDE END UNIT**  
SCALE: 3/16" = 1'-0"



**SECOND FLOOR PARTIAL - SIDE END UNIT**  
SCALE: 3/16" = 1'-0"



**FIRST FLOOR PARTIAL - SIDE END UNIT**  
SCALE: 3/16" = 1'-0"

**Southeast Zone**  
2475 Northwinds Pkwy. Suite 600  
Alpharetta, GA 30009 (770) 381-3450



RELEASED FOR CONSTRUCTION

Left Elevations 61-70  
& Floor Plan Partials

PRODUCTION MANAGER  
Don Kostka  
INITIAL RELEASE DATE:  
12-08-2015  
CURRENT RELEASE DATE:  
12-08-2015

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GARAGE HANDING  
**FL-GE-ME-KC-KR**

PLAN NAME  
Summerford & Hutton  
NFC PLAN NUMBER  
**2468.928 - 2468.929**  
LAWSON PLAN ID

SHEET  
**A.3.30S**

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.

RELEASED FOR CONSTRUCTION

Rear Elevations

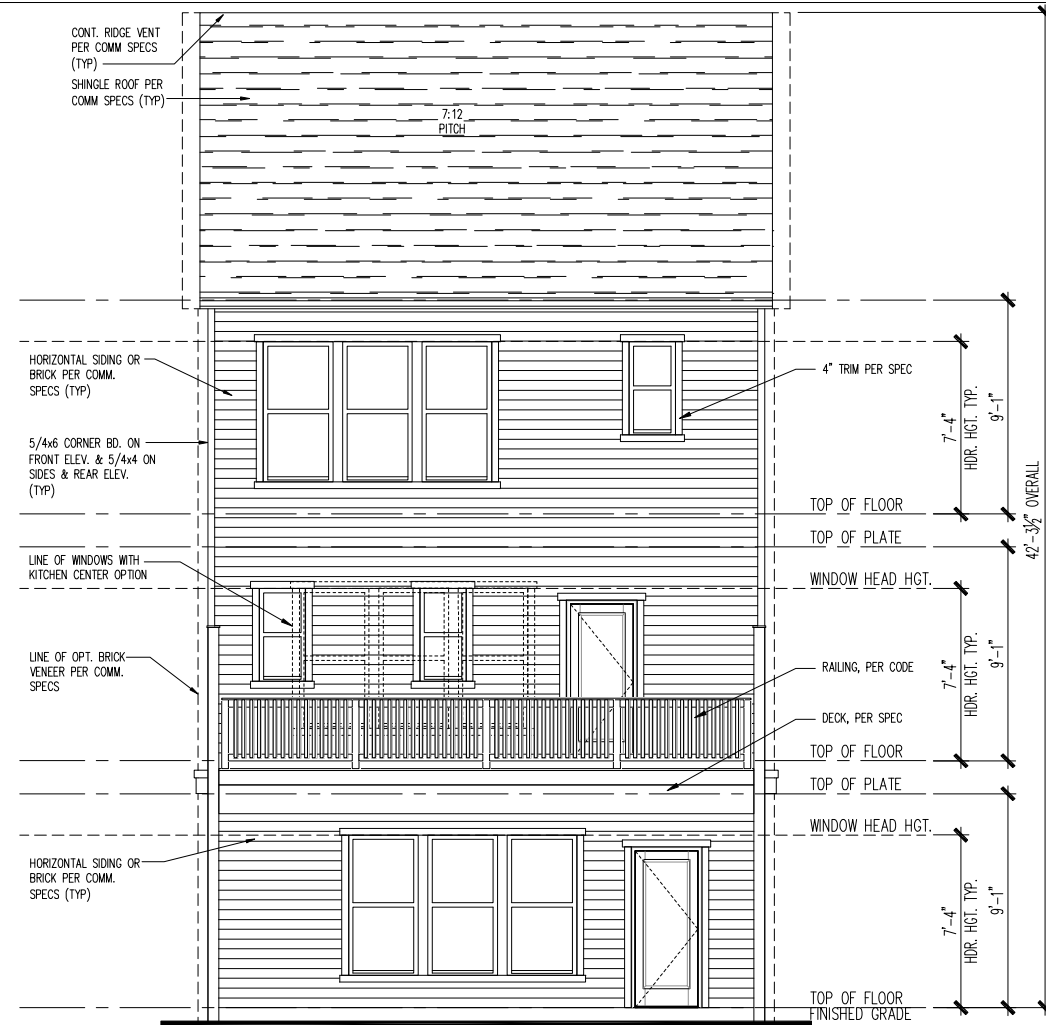
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| PRODUCTION MANAGER    | Don Kostka |
| INITIAL RELEASE DATE: | 12-08-2015 |
| CURRENT RELEASE DATE: | 12-08-2015 |

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GARAGE HANDING  
 FL-GE-ME-KC-KR

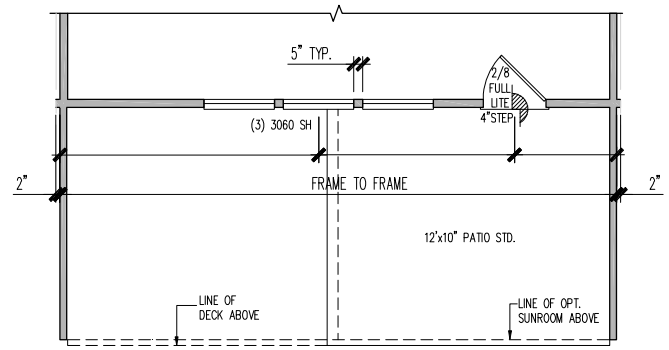
PLAN NAME  
 Summerford & Hutton  
 NPC PLAN NUMBER  
 2468.928 - 2468.929  
 LAWSON PLAN ID

SHEET  
 A.3.60



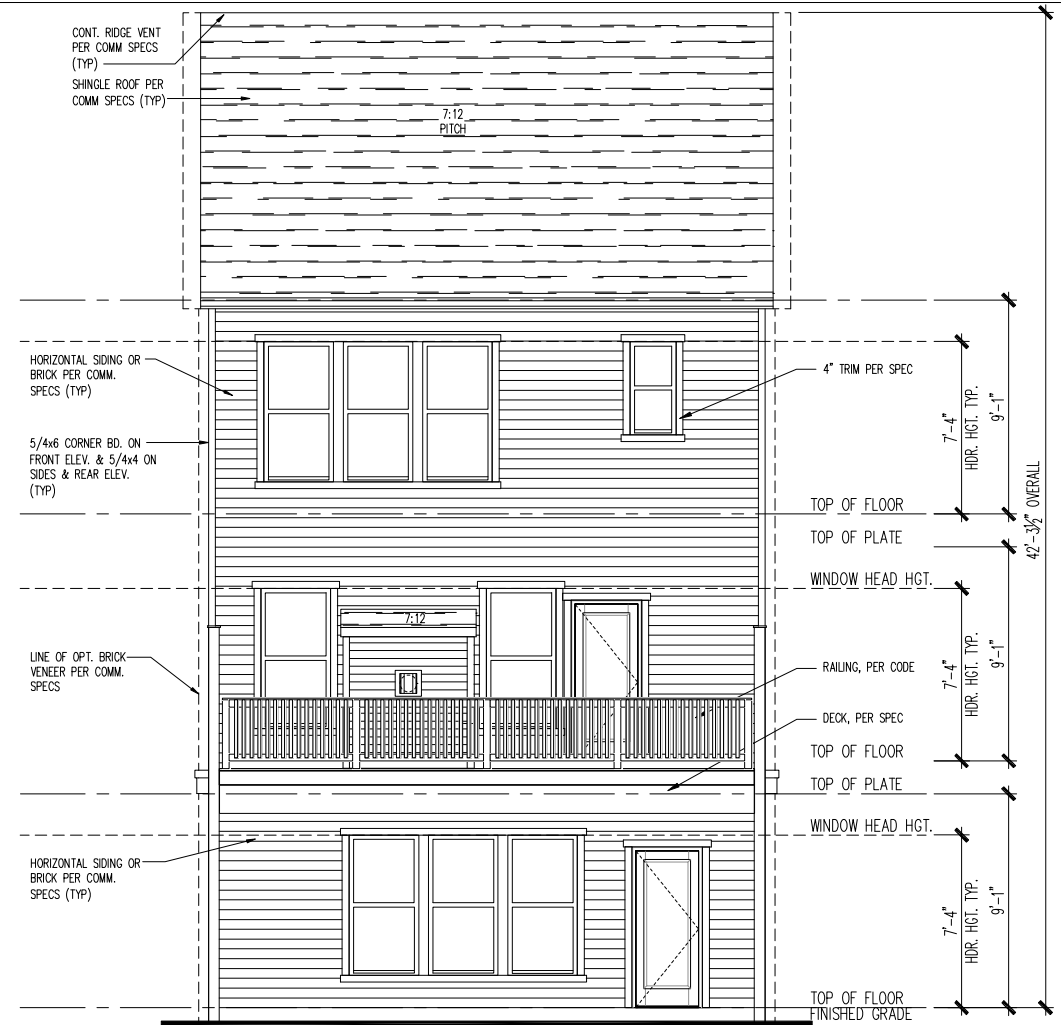
**REAR ELEVATION**

SCALE: 1/4" = 1'-0"



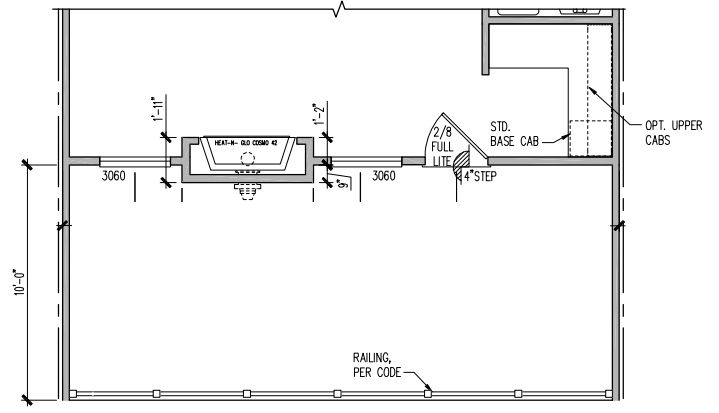
**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"



**REAR ELEVATION - FIREPLACE OPTION w/ DECK 3**

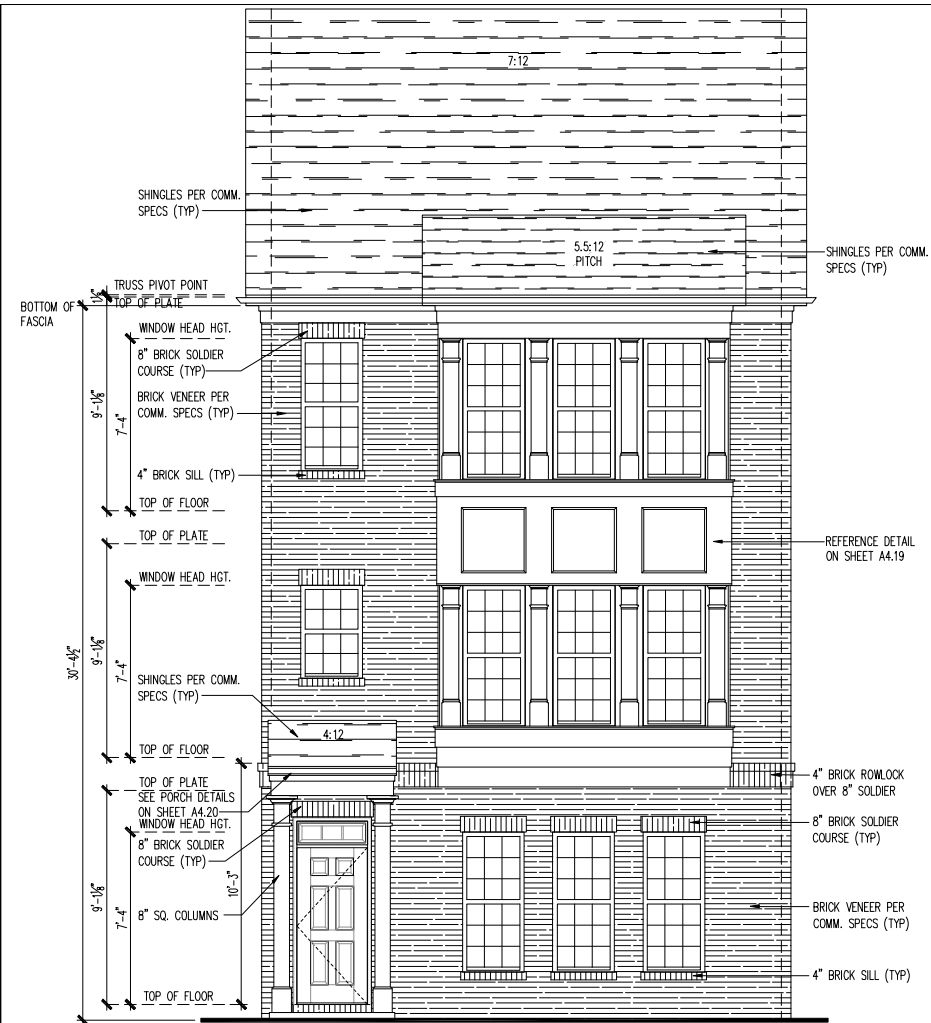
SCALE: 1/4" = 1'-0"



**FIREPLACE OPTION AT GATHERING ROOM w/ DECK 3**

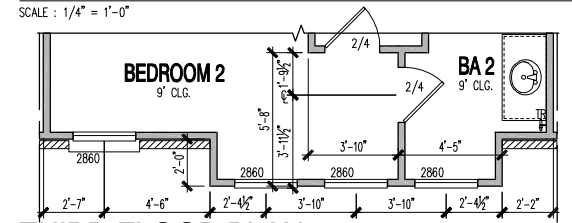
SCALE: 1/4" = 1'-0"

SEE BASE PLANS FOR INFORMATION NOT SHOWN



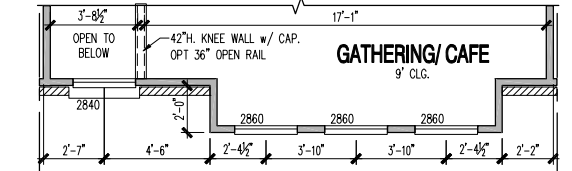
**FRONT ELEVATION "64"**

SCALE: 1/4" = 1'-0"



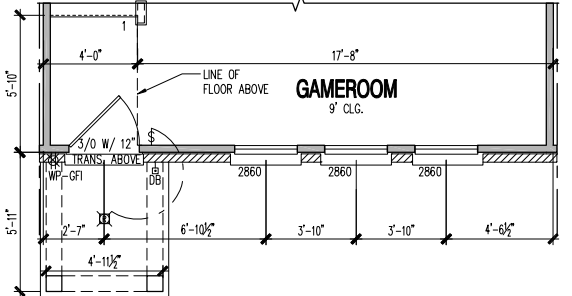
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



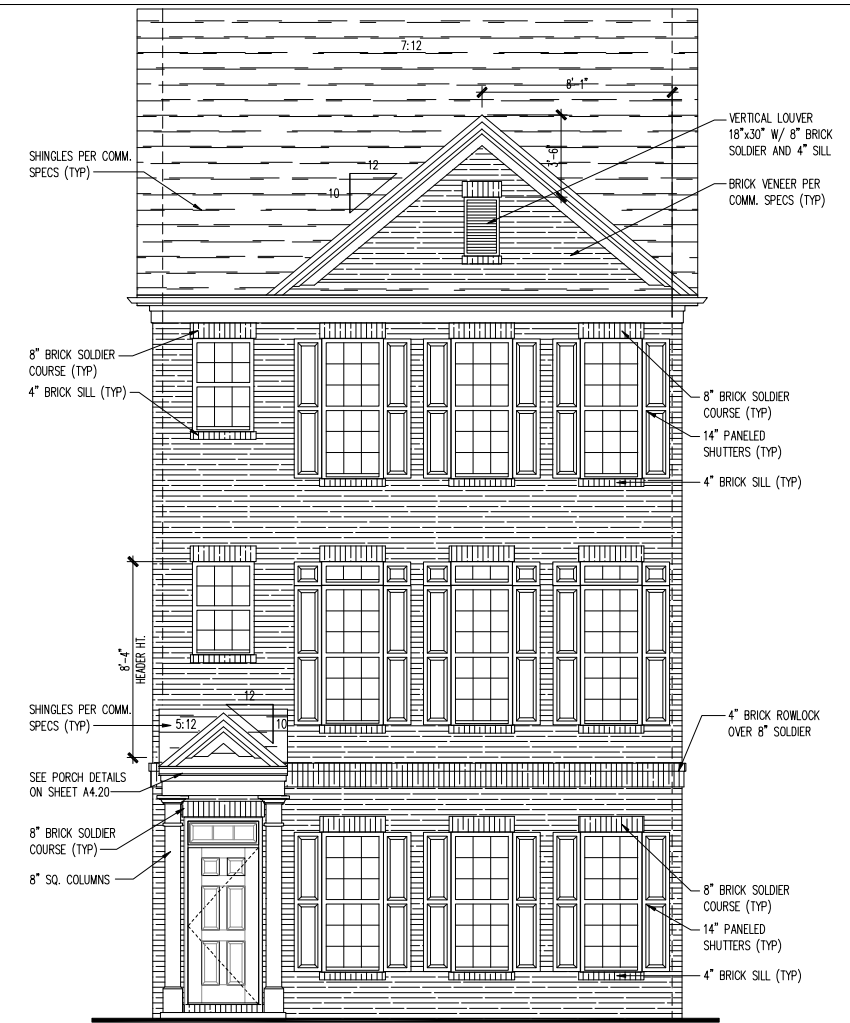
**SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



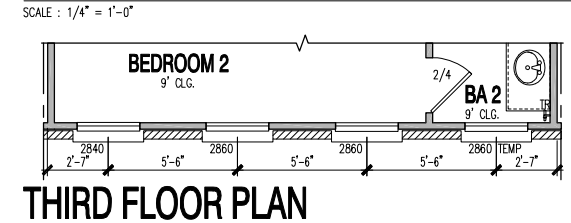
**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"



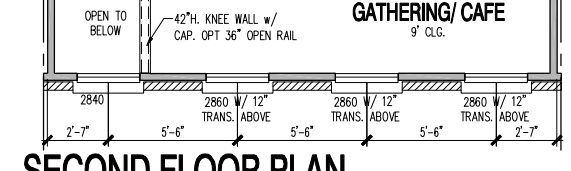
**FRONT ELEVATION "65"**

SCALE: 1/4" = 1'-0"



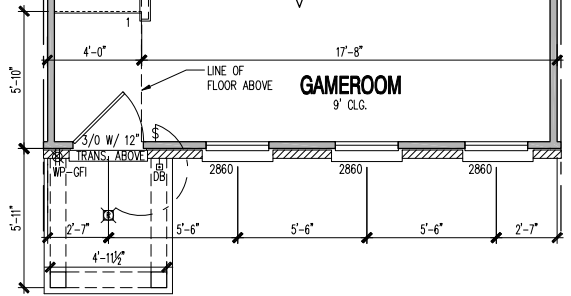
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



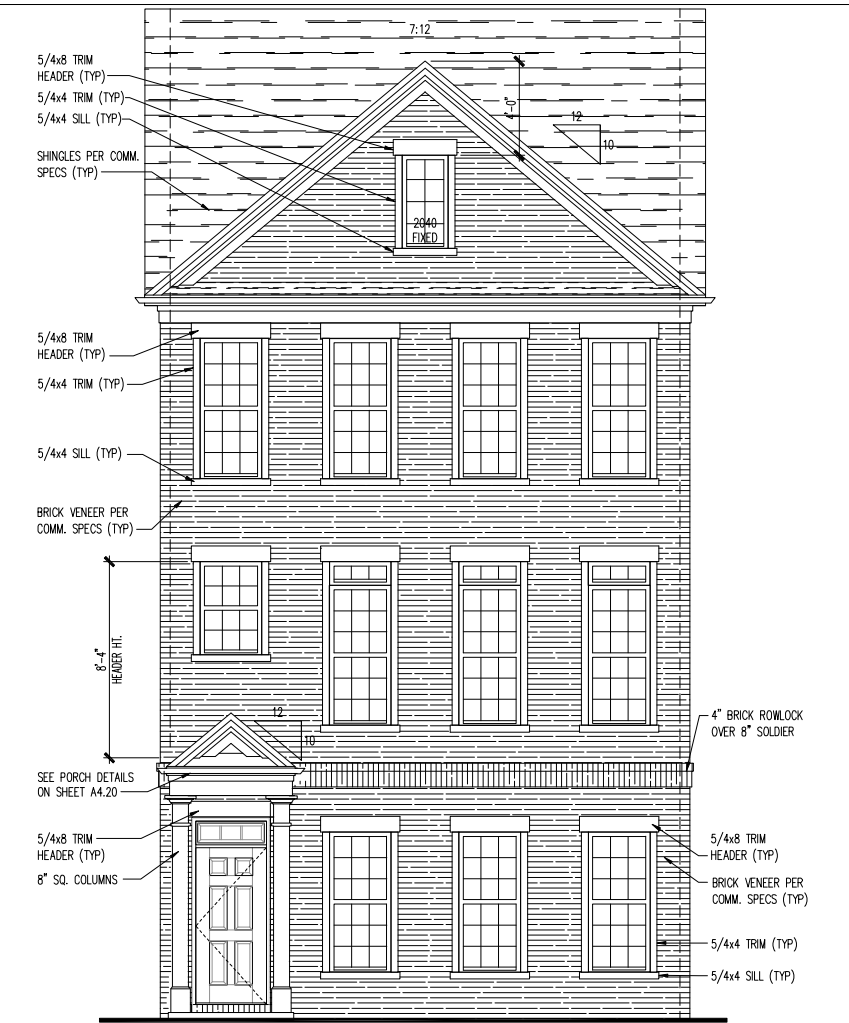
**SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



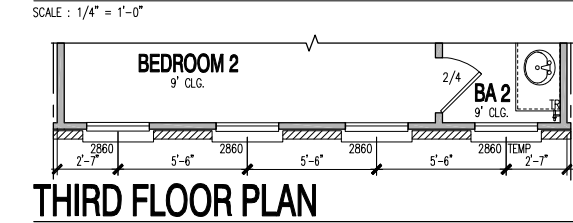
**FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"



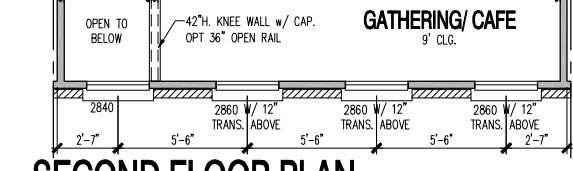
**FRONT ELEVATION "66"**

SCALE: 1/4" = 1'-0"



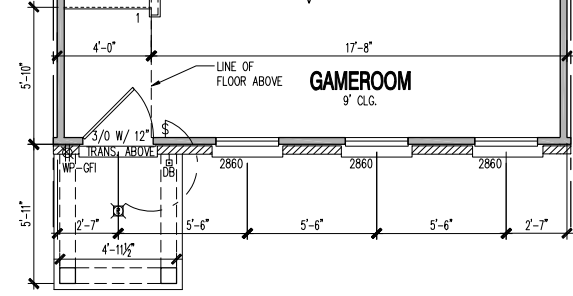
**THIRD FLOOR PLAN**

SCALE: 1/4" = 1'-0"



**SECOND FLOOR PLAN**

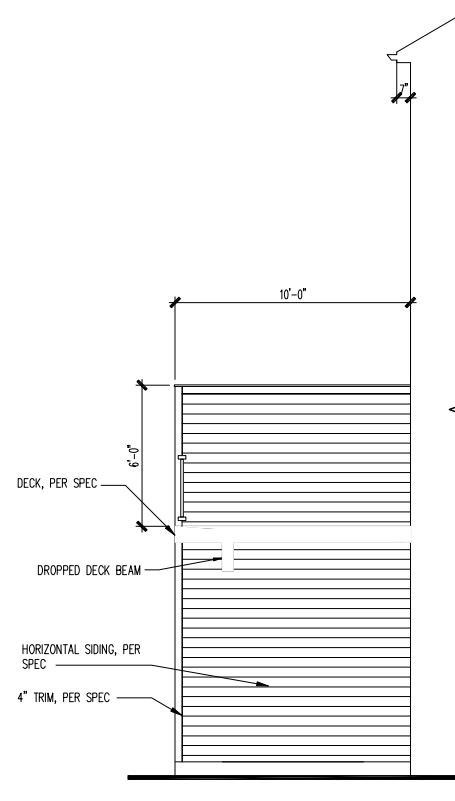
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**FIRST FLOOR PLAN**

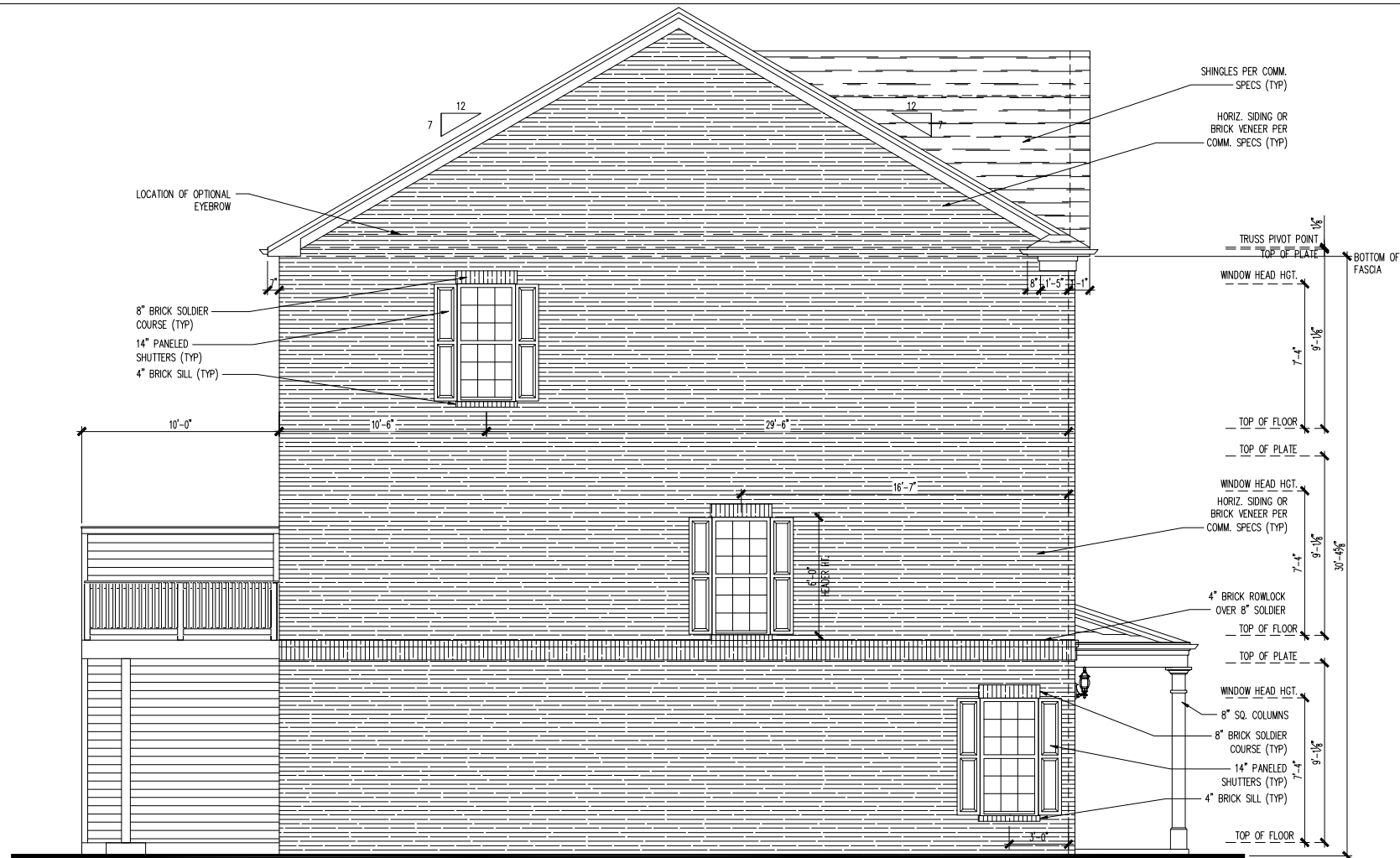
SCALE: 1/4" = 1'-0"

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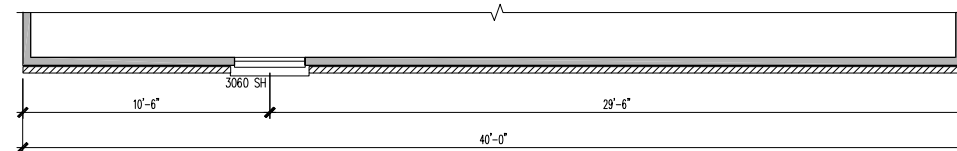
**REAR DECK  
MIDDLE CONDITION**

SCALE: 1/4" = 1'-0"



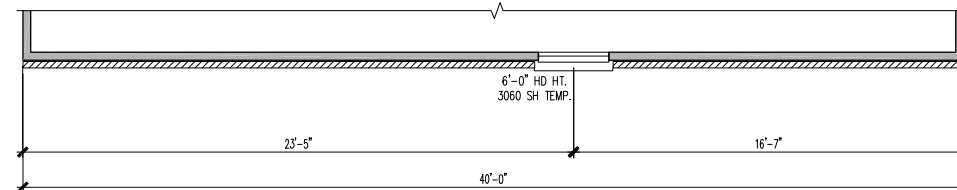
**LEFT ELEVATION "61-70"**

SCALE: 1/4" = 1'-0"



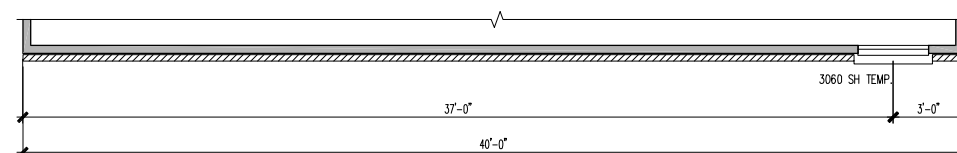
**THIRD FLOOR PARTIAL - SIDE END UNIT**

SCALE: 1/4" = 1'-0"



**SECOND FLOOR PARTIAL - SIDE END UNIT**

SCALE: 1/4" = 1'-0"



**FIRST FLOOR PARTIAL - SIDE END UNIT**

SCALE: 1/4" = 1'-0"



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| PRODUCTION MANAGER    | Don Koska  |
| INITIAL RELEASE DATE: | 12-08-2015 |
| CURRENT RELEASE DATE: | 1-29-2016  |

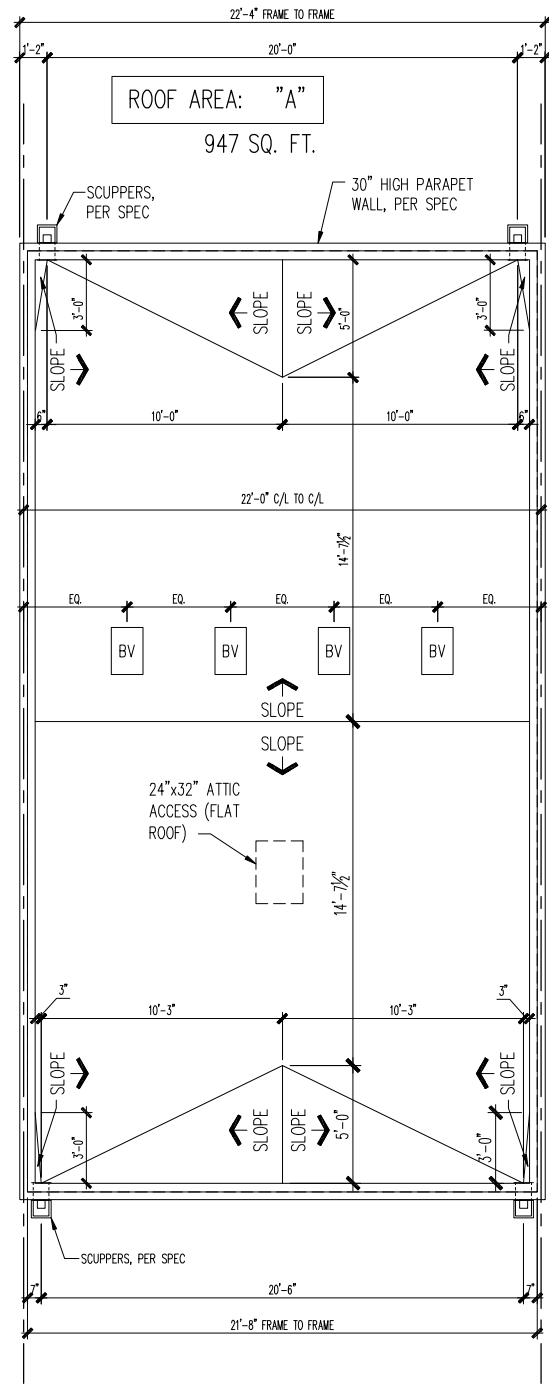
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| GARAGE HANDING | RL-ME-KC-KR |
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|                 |                     |
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| PLAN NAME       | Hayward/ Briarcliff |
| NPC PLAN NUMBER | 2466.237 - 2466.238 |
| LAWSON PLAN ID  |                     |

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| SHEET | A.3.19 |
|-------|--------|





**ROOF PLAN**  
SCALE: 1/4" = 1'-0"

**ATTIC VENTILATION:** (300 SQ FT ATTIC SPACE / 1 SQ FT VENTILATION)  
W/ 40%-50% REQ. VENTS GREATER THAN OR EQUAL TO 3" ABOVE  
EAVE / CORNICE VENTS PER IRC R806.2

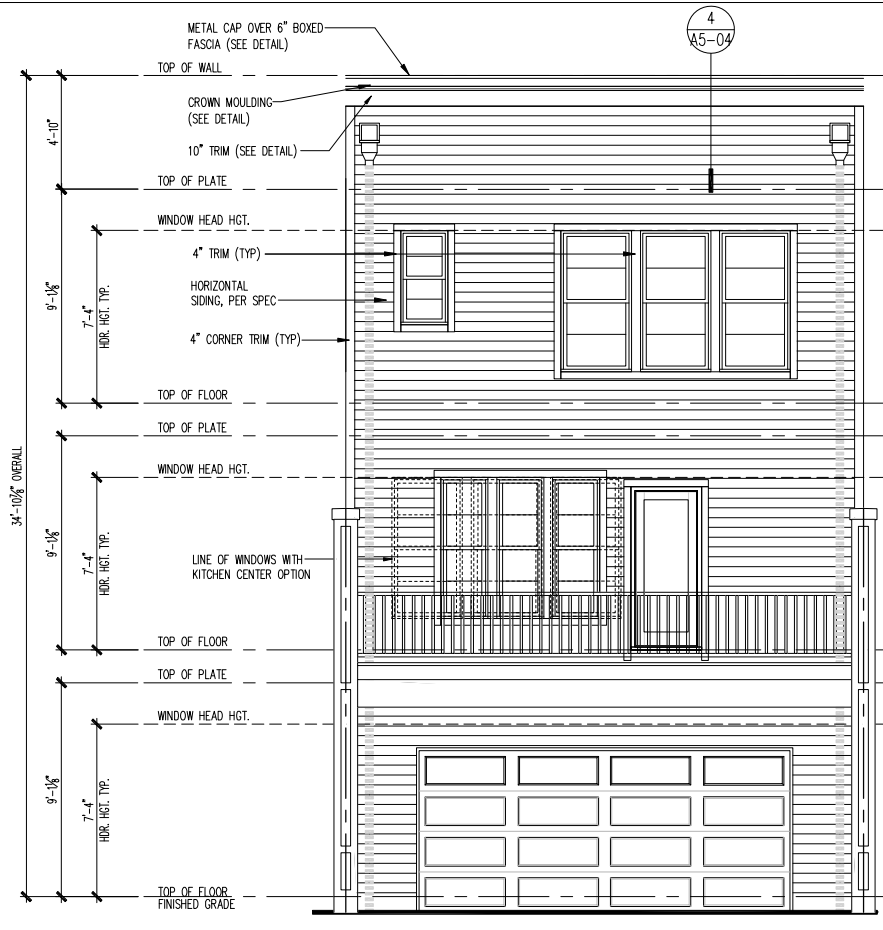
ELEVATION "Z"  
866 SQ FT UNDER ROOF ATTIC /  
300 SQ FT / 1 SQ FT = 2.89 SQ FT VENTILATION

2.89 SQ FT x 50% = 1.443 SQ FT RIDGE, 2.89 SQ FT x 50% = 1.443 SQ FT SOFFIT  
OR W/ HIP, BOX VENT

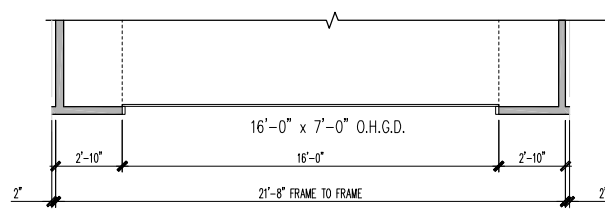
1.443 SQ FT = 11.5 FEET OF RIDGE VENT      1.443 SQ FT = 4.2 BOX VENT(S)  
0.125 SQ FT      0.3472 SQ FT

SOFFIT VENT  
1.443 SQ FT = 23.1 FEET OF SOFFIT VENT  
0.0625 SQ FT

\*CALCULATIONS REFLECT 50 % RIDGE AND 50 % SOFFIT VENTS ALLOWABLE PER SECTION IRC R806.2



**REAR ELEVATION**  
SCALE: 1/4" = 1'-0"



**FIRST FLOOR PLAN**  
SCALE: 1/4" = 1'-0"

**Southeast Zone**  
2475 Northwinds Pkwy, Suite 600  
Alpharetta, GA 30009 (770) 381-3450



**Rear Elevation 21-25  
& Roof Plan**

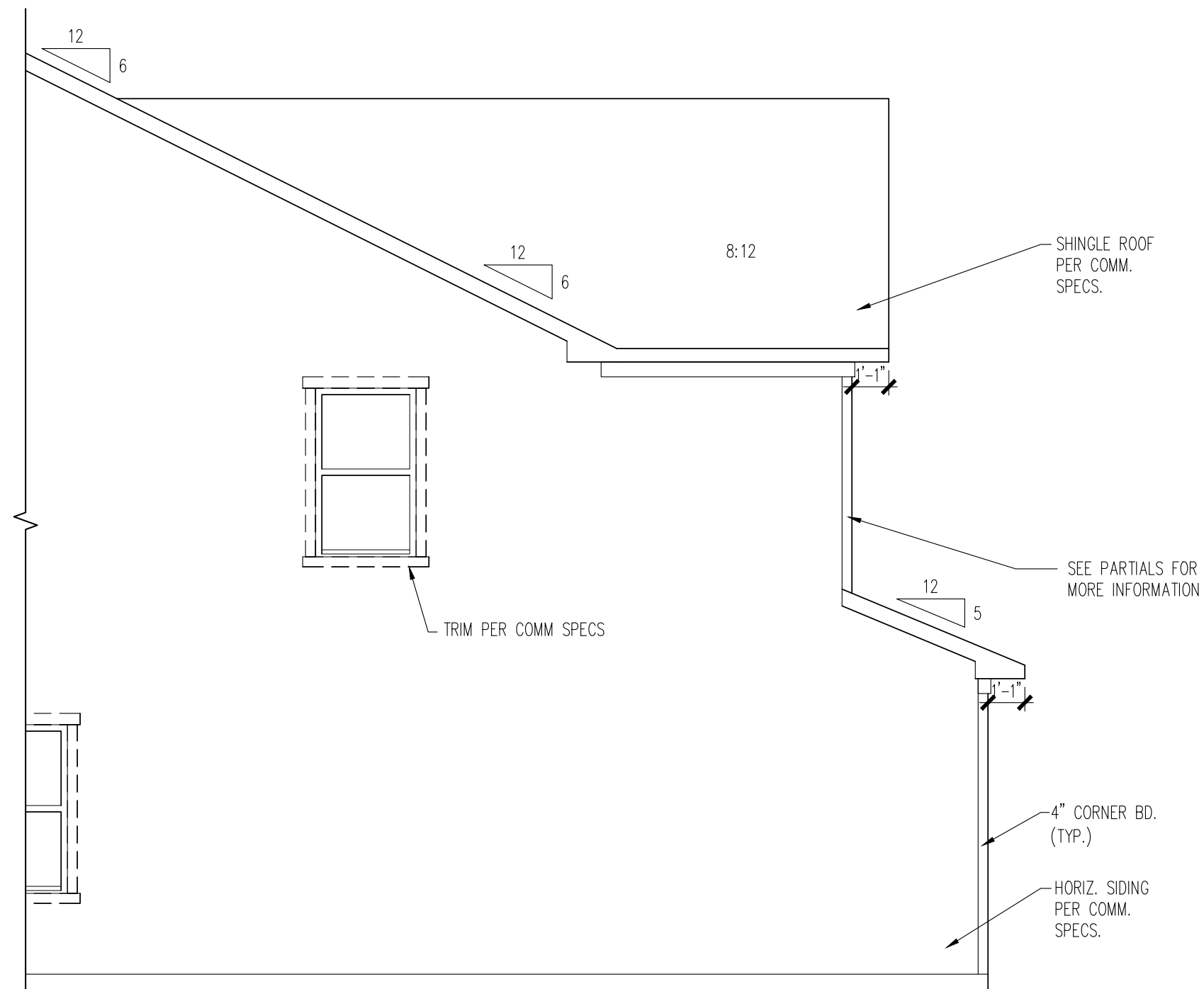
PRODUCTION MANAGER  
Don Kostka  
INITIAL RELEASE DATE:  
12-08-2015  
CURRENT RELEASE DATE:  
1-29-2016

| REV # | DATE / DESCRIPTION |
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GARAGE HANDING  
**RL-ME-KC-KR**

PLAN NAME  
Hayward / Briarcliff  
NPC PLAN NUMBER  
**2466.237 - 2466.238**  
LAWSON PLAN ID

SHEET  
**A.3.20**



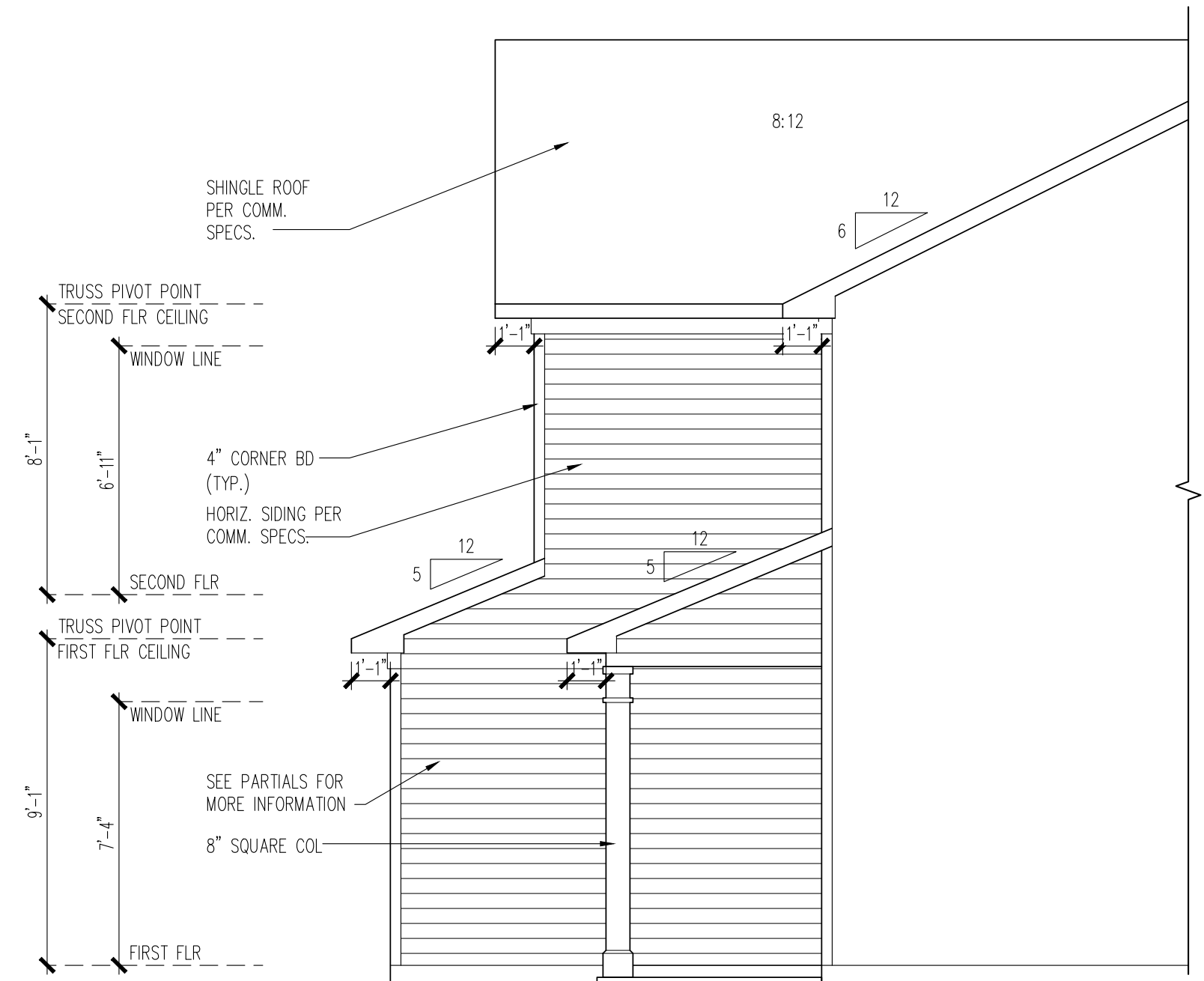
**PART, LEFT SIDE ELEV. "LC1A"**

SCALE : 1/4" = 1'-0"



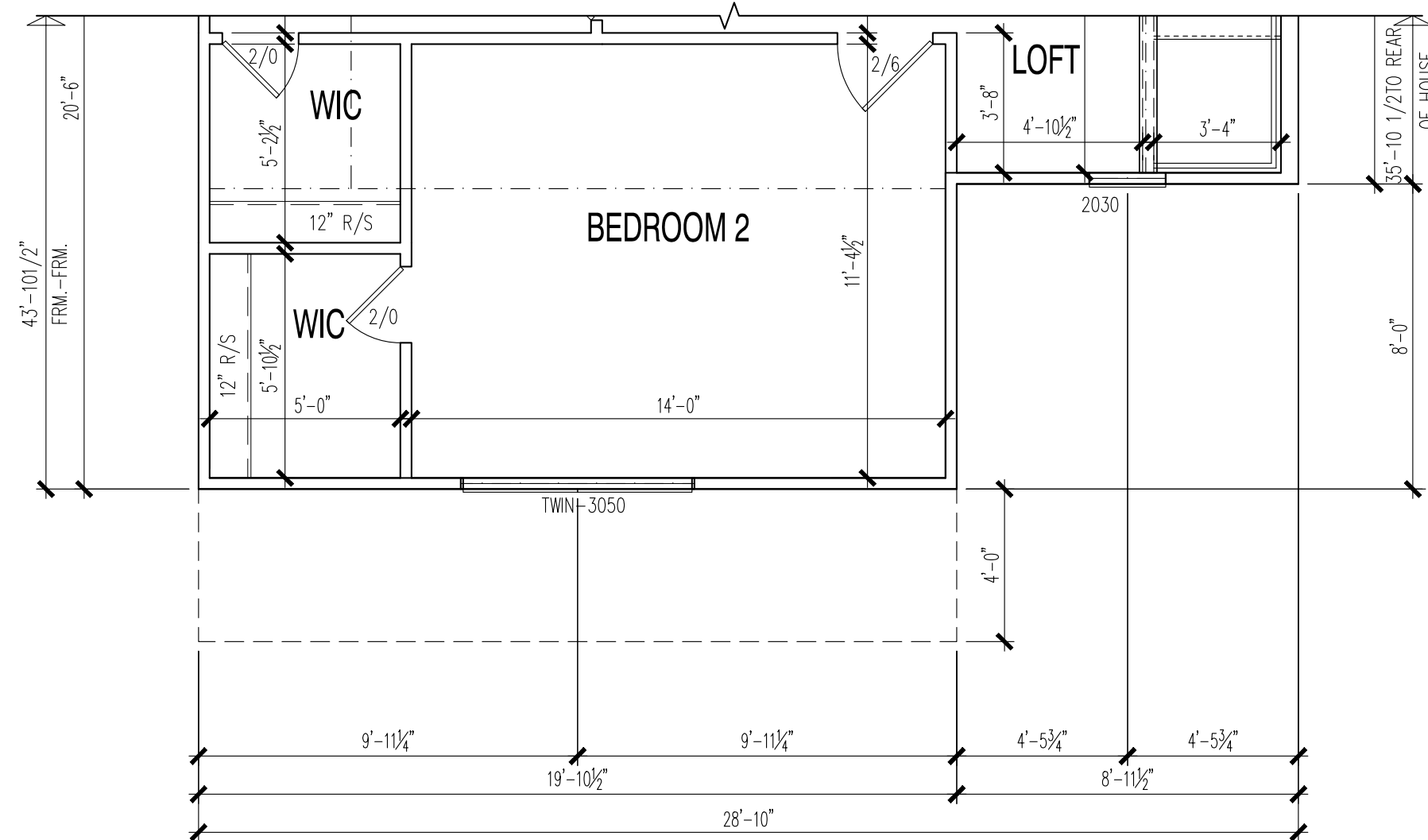
**FRONT ELEVATION "LC1A" FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



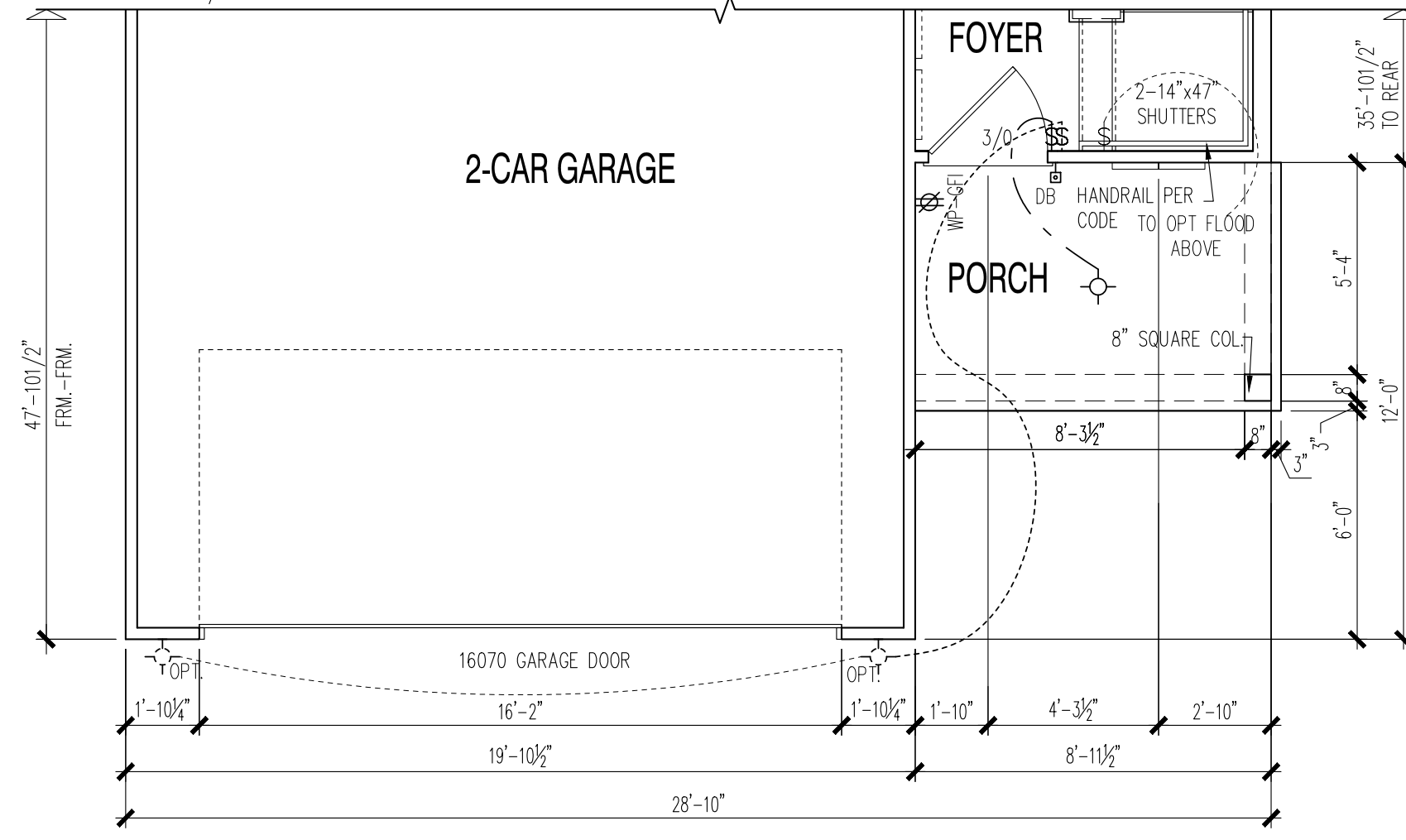
**PART, RIGHT SIDE ELEV. "LC1A"**

SCALE : 1/4" = 1'-0"



**PARTIAL SECOND FLOOR PLAN**

SCALE : 1/4" = 1'-0"



**PARTIAL FIRST FLOOR PLAN**

SCALE : 1/4" = 1'-0"

NOTE:  
ADD 1X4 WINDBORNE  
DEBRIS TRIM AROUND ALL  
WINDOWS PER COMM SPEC

**Southeast Zone**  
2475 Northwinds Pkwy, Suite 600  
Alpharetta, GA 30009 (770) 381-3450



The HARRIS  
FRONT ELEVATION "LC1A"  
FRONT ENTRY GARAGE

| PRODUCT MANAGER |                  |
|-----------------|------------------|
| INITIAL RELEASE | DATE: 00/00/0000 |
| REVA            | DATE/DESCRIPTION |
|                 |                  |
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|                 |                  |

PROJECT TYPE  
**Single Family**

SPECIFICATION LEVEL  
**Pulte**

PLAN NAME  
**Harris**

NPC NUMBER  
**8126.200**

SHEET  
**3.10**

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.

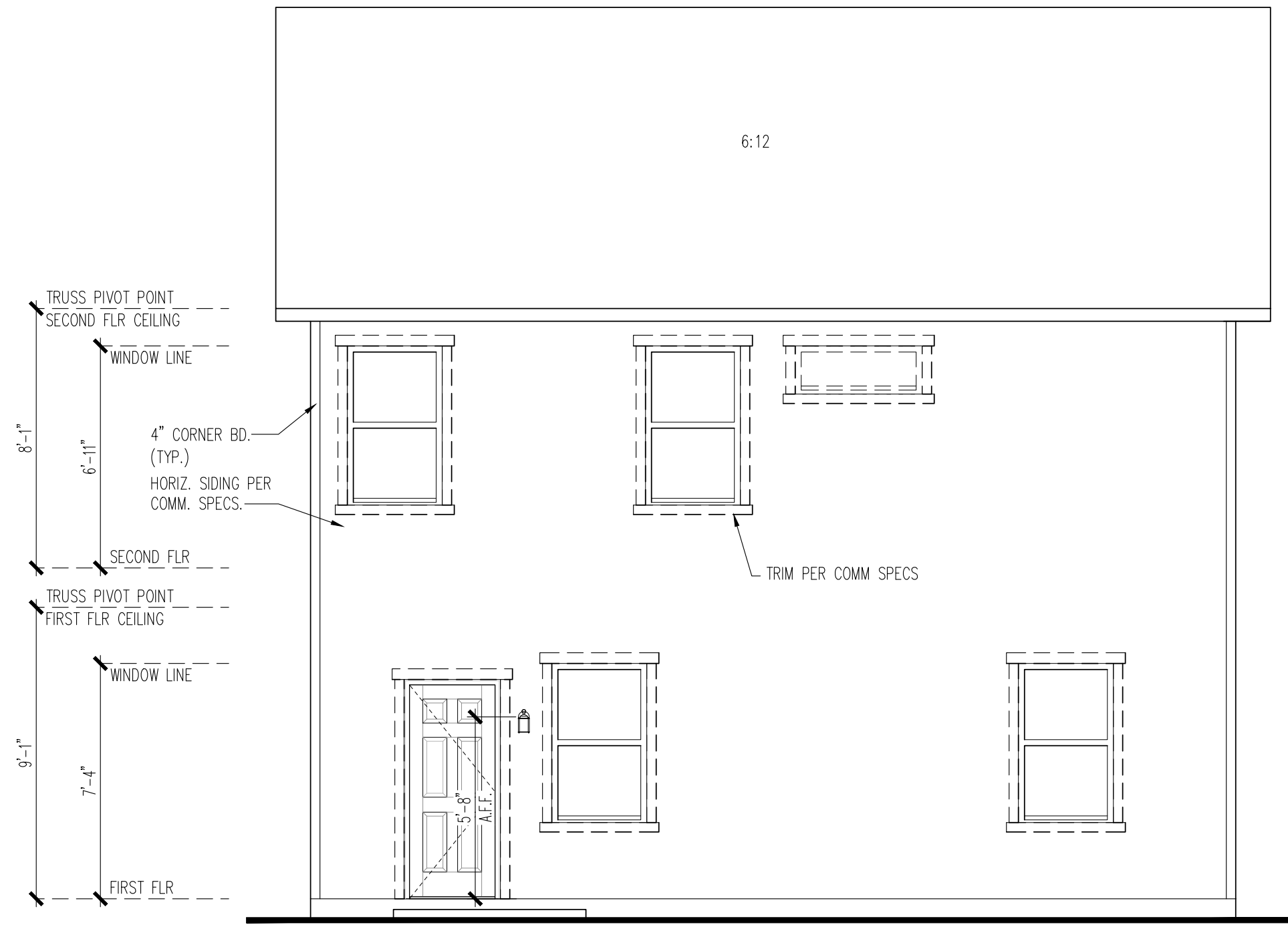
| PRODUCT MANAGER |                  |
|-----------------|------------------|
| INITIAL RELEASE | DATE: 00/00/0000 |
| REV#            | DATE/DESCRIPTION |
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PROJECT TYPE  
**Single Family**

SPECIFICATION LEVEL  
**Pulte**

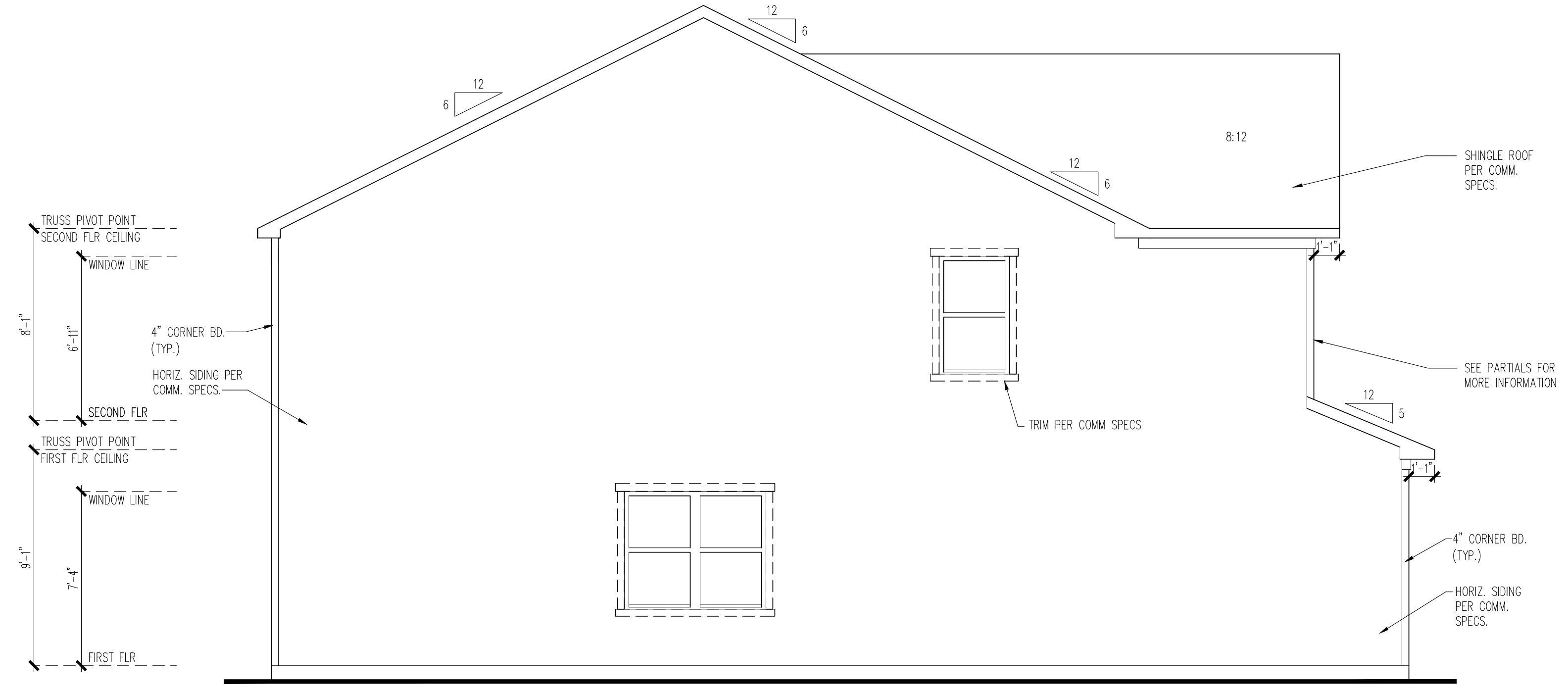
PLAN NAME  
**Harris**  
NPC NUMBER  
**8126.200**

SHEET  
**3.SR.3**



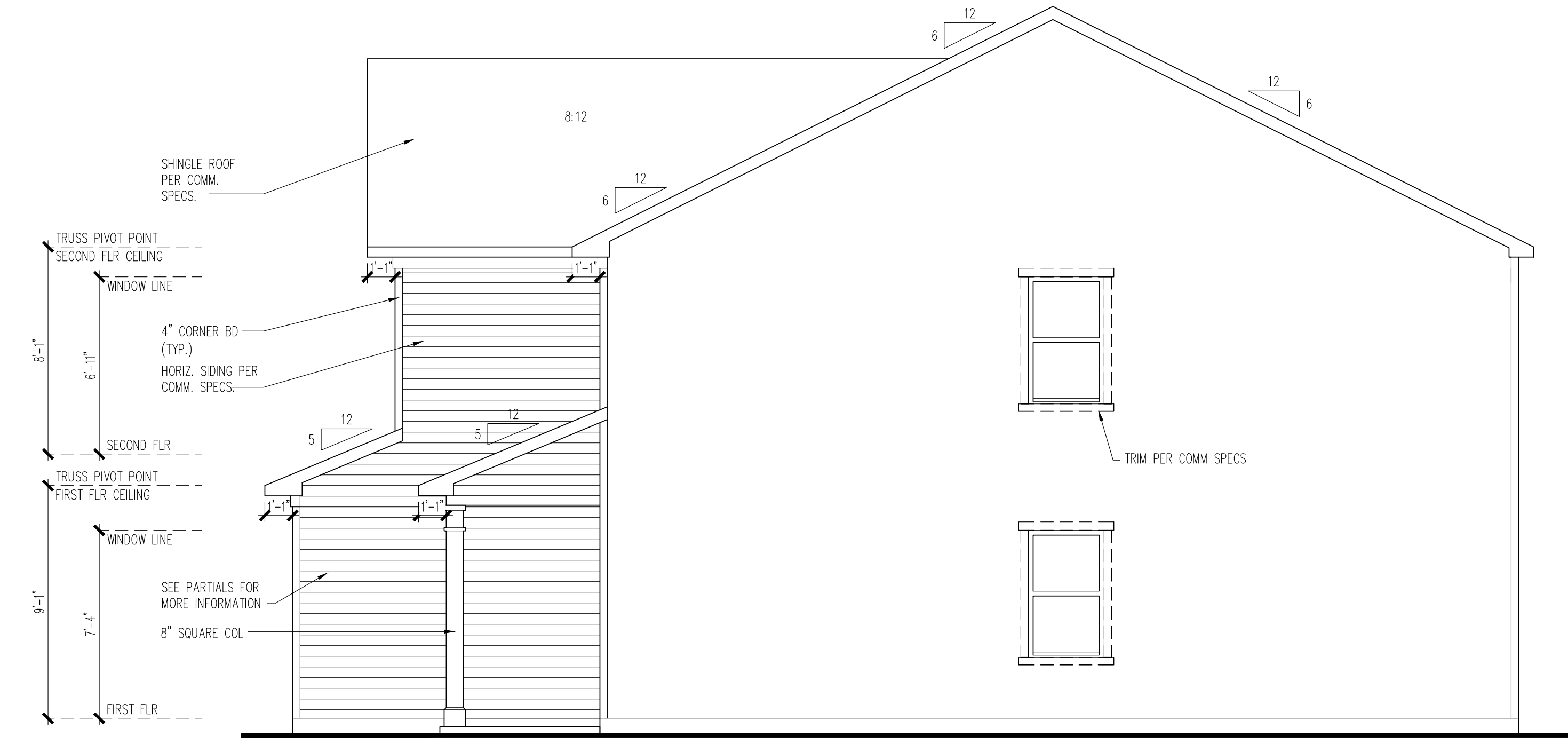
**REAR ELEVATION "LC2A" FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



**LEFT SIDE ELEVATION "LC2A" FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



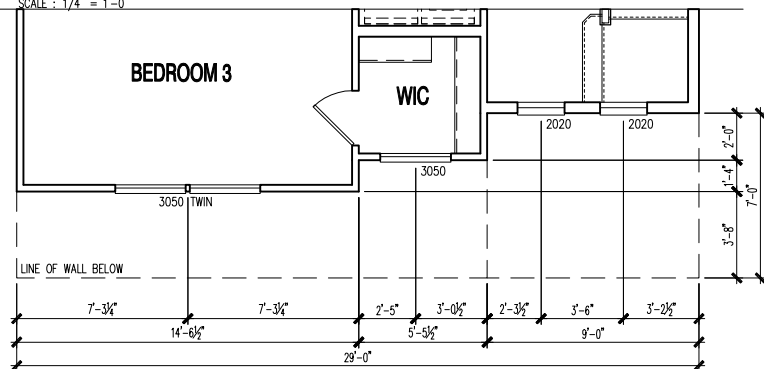
**RIGHT SIDE ELEVATION "LC2A" FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



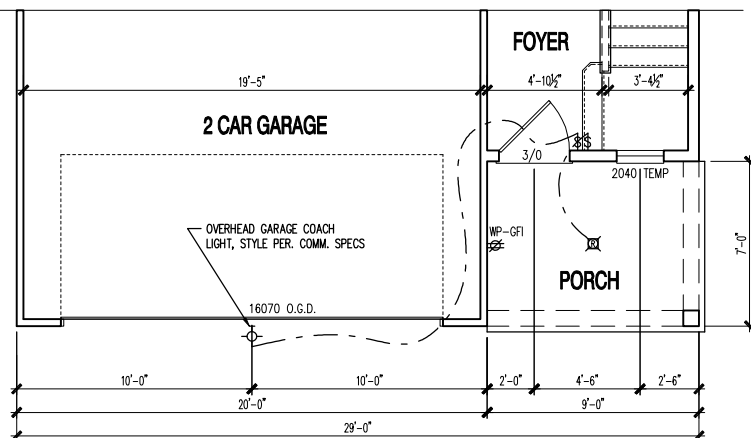
**FRONT ELEVATION "1"**

SCALE: 1/4" = 1'-0"



**PARTIAL SECOND FLOOR PLAN**

SCALE: 1/4" = 1'-0"



**PARTIAL FIRST FLOOR PLAN**

SCALE: 1/4" = 1'-0"

**ATTIC VENTILATION:** (300 SQ FT ATTIC SPACE / 1 SQ FT VENTILATION)  
 W/ 40%-50% REQ. VENTS GREATER THAN OR EQUAL TO 3" ABOVE  
 EAVE / CORNICE VENTS PER IRC R806.2

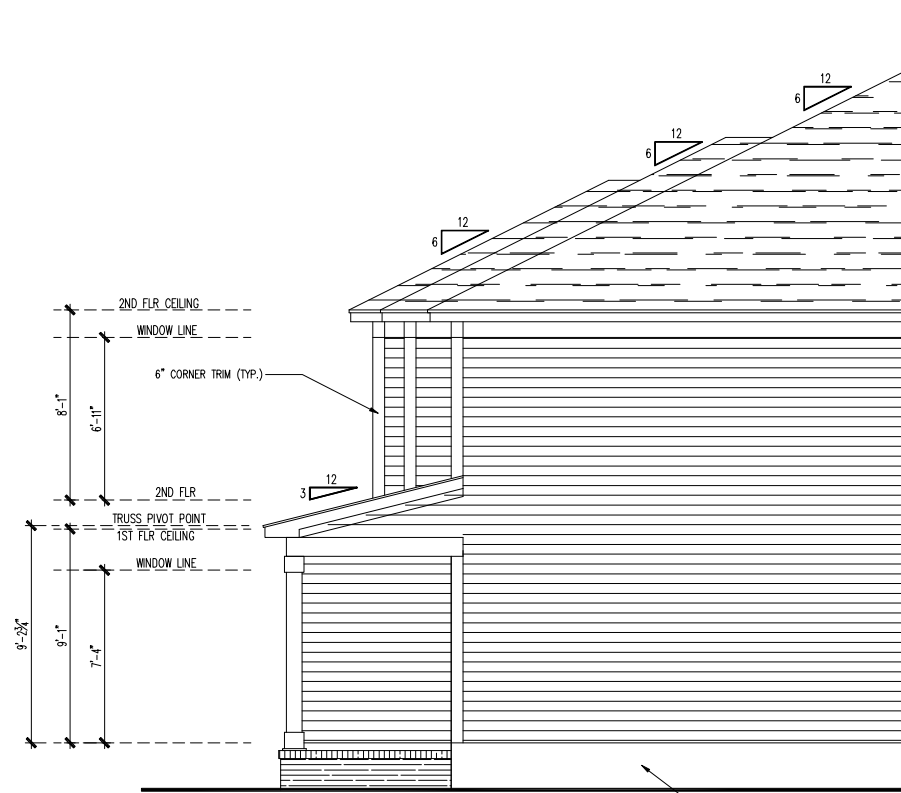
MORRISON ELEV 1 1095 SQ FT UNDER ROOF ATTIC /  
 300 SQ FT / 1 SQ FT = 3.65 SQ FT VENTILATION

RIDGE VENT 18 SQ IN = (.125 SQ FT)  
 BOX VENT 50 SQ IN = (.3472 SQ FT)  
 SOFFIT VENT 9 SQ IN = (.0625 SQ FT)

3.65 SQ FT x 50% = 1.825 SQ FT RIDGE, 3.65 SQ FT x 50% = 1.825 SQ FT SOFFIT  
 RIDGE VENT OR W/ HIP, BOX VENT  
 1.825 SQ FT = 14.6 FEET OF RIDGE VENT 1.825 SQ FT = 5.3 BOX VENT(S)  
 0.125 SQ FT 0.3472 SQ FT

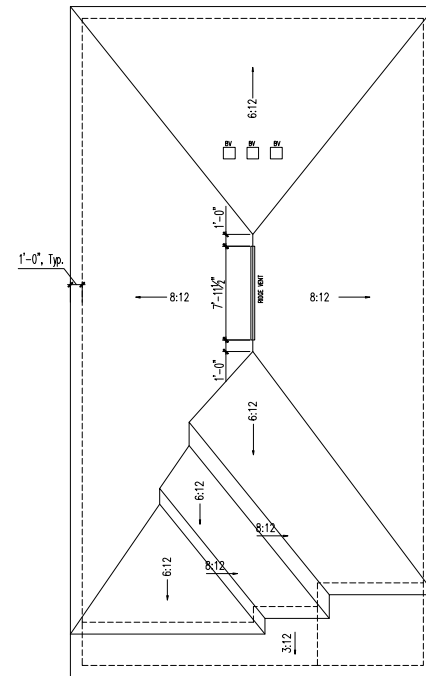
SOFFIT VENT  
 1.825 SQ FT = 29.2 FEET OF SOFFIT VENT  
 0.0625 SQ FT

\*CALCULATIONS REFLECT 50% RIDGE AND 50% SOFFIT VENTS ALLOWABLE PER SECTION IRC R806.2



**RIGHT SIDE ELEVATION**

SCALE: 1/4" = 1'-0"



**ROOF PLAN**

SCALE: 1/8" = 1'-0"

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**Southeast Area**  
 2475 Northwinds Pkwy, Suite 525  
 Alpharetta, GA 30009 (770) 381-3450



The MORRISON  
 FRONT ELEVATION "1"

| REV #   | DATE / DESCRIPTION            |
|---------|-------------------------------|
| 7-30-17 | ACKLEY                        |
| 6-21-18 | CURRENT RELEASE DATE: 7-30-17 |
| 1-8-19  |                               |

PROJECT TYPE  
**SINGLE FAMILY**

COMMUNITY NAME  
**SOUTHEAST AREA SET**  
 LAWSON COMMUNITY ID

GARAGE HANDING

SPECIFICATION LEVEL  
**P1, P2**

PLAN NAME  
**MORRISON**  
 NPC PLAN NUMBER

LAWSON PLAN ID

LEGACY PLAN NUMBER / NAME  
 same as current

SHEET  
**3.1**

PLOTTED: August 2, 2019 / Paul Howard / MORRISON ELEVATIONS - LEFT.DWG

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.





**RIGHT SIDE ELEVATION**

SCALE : 1/4" = 1'-0"

18"-24" RAISED SLAB,  
 MASONRY/PARGING  
 PER COMM SPECS.

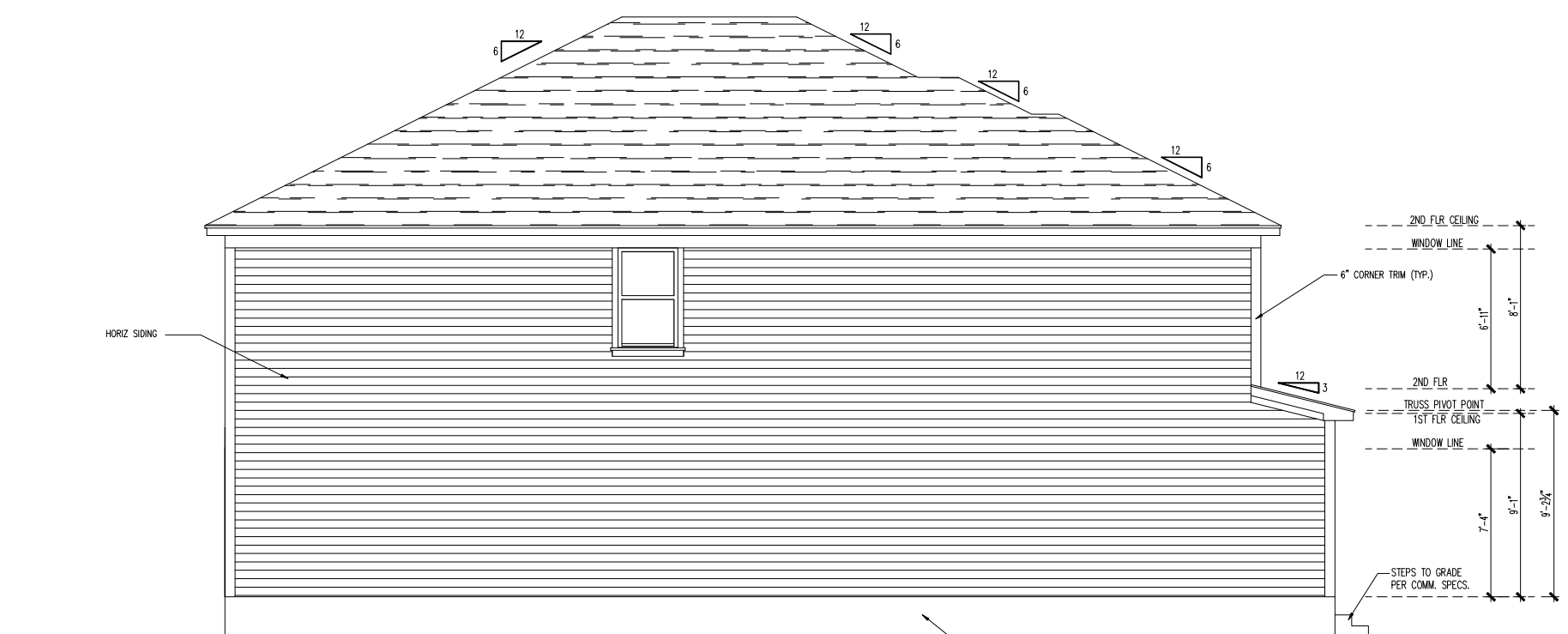


**REAR ELEVATION**

SCALE : 1/4" = 1'-0"

STEPS TO GRADE PER COMM. SPECS.

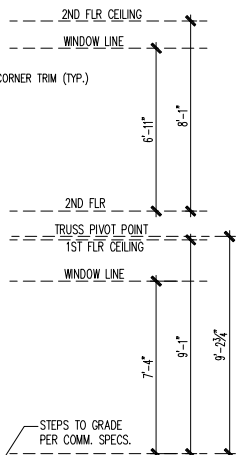
18"-24" RAISED SLAB,  
 MASONRY/PARGING  
 PER COMM SPECS.



**LEFT SIDE ELEVATION**

SCALE : 1/4" = 1'-0"

18"-24" RAISED SLAB, MASONRY/PARGING  
 PER COMM SPECS.



STEPS TO GRADE  
 PER COMM. SPECS.

|                       |         |
|-----------------------|---------|
| PRODUCTION MANAGER    | ACKLEY  |
| CURRENT RELEASE DATE: | 7-30-17 |

| REV # | DATE / DESCRIPTION |
|-------|--------------------|
| △     | 6-21-18            |
| △     | 1-8-19             |
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| △     |                    |
| △     |                    |

PROJECT TYPE  
**SINGLE FAMILY**

COMMUNITY NAME  
**SOUTHEAST AREA SET**  
 LAWSON COMMUNITY ID

GARAGE HANDING

SPECIFICATION LEVEL  
**P1, P2**

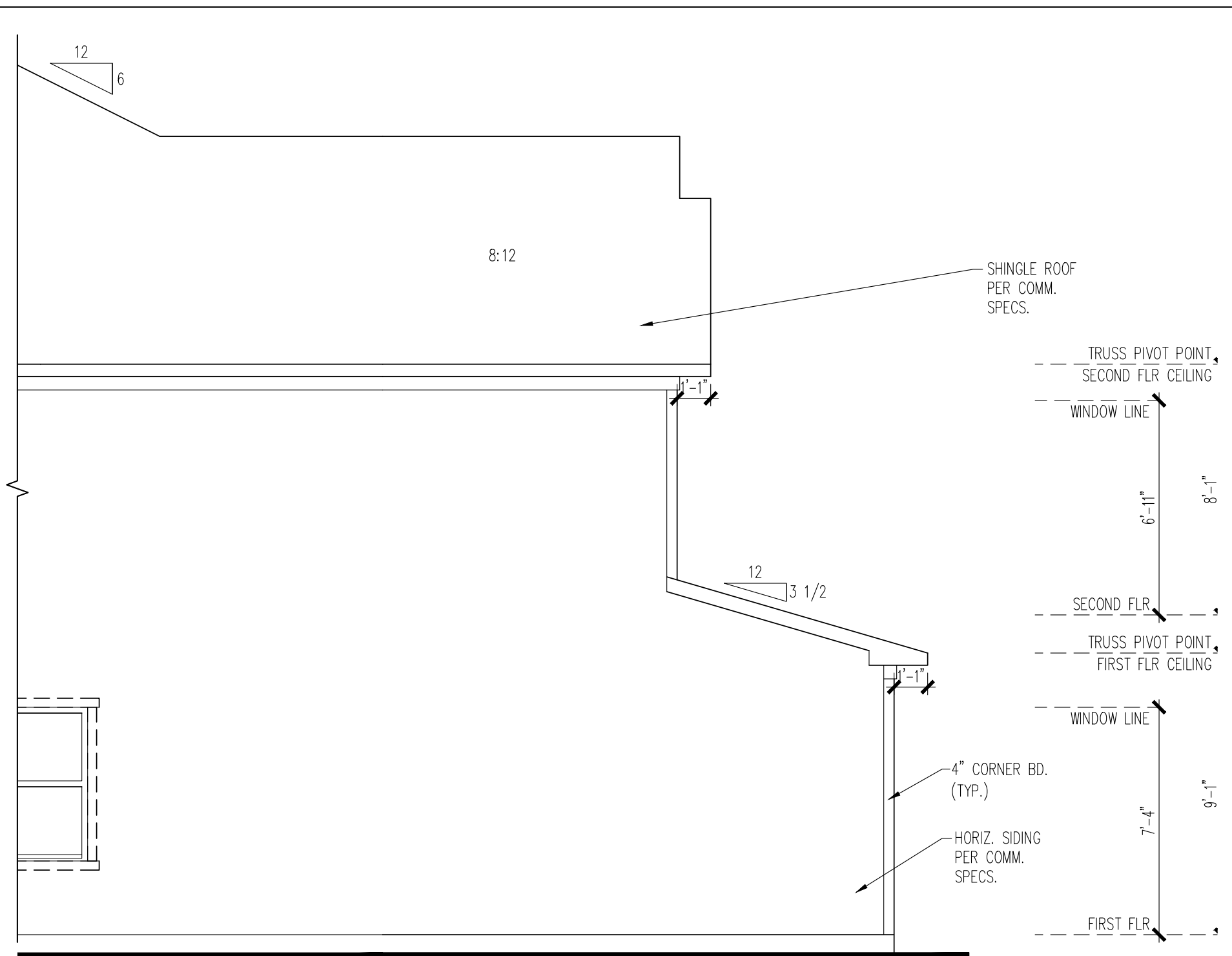
PLAN NAME  
**MORRISON**  
 NPC PLAN NUMBER

LAWSON PLAN ID

LEGACY PLAN NUMBER / NAME  
**same as current**

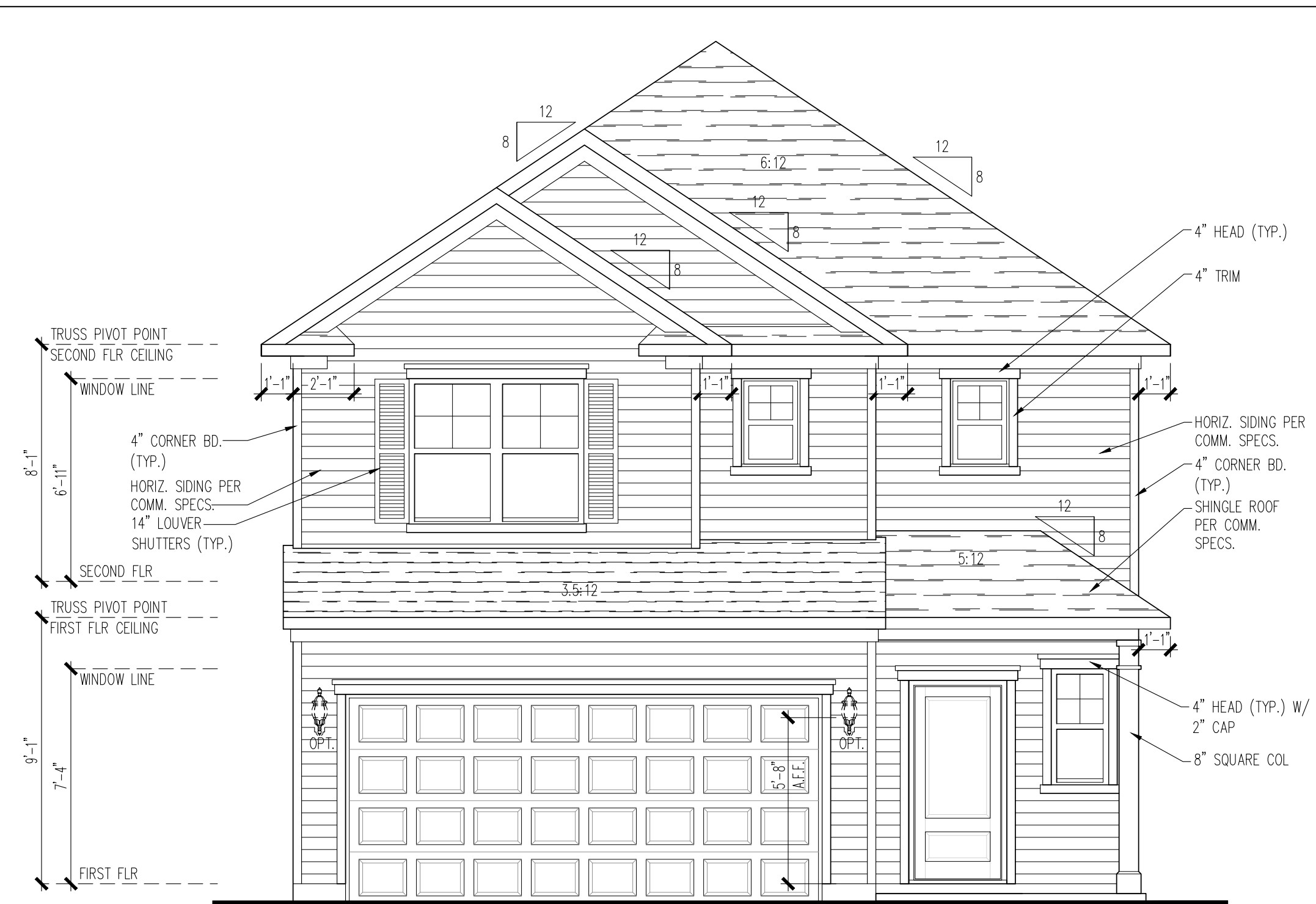
SHEET  
**3.SR**

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.



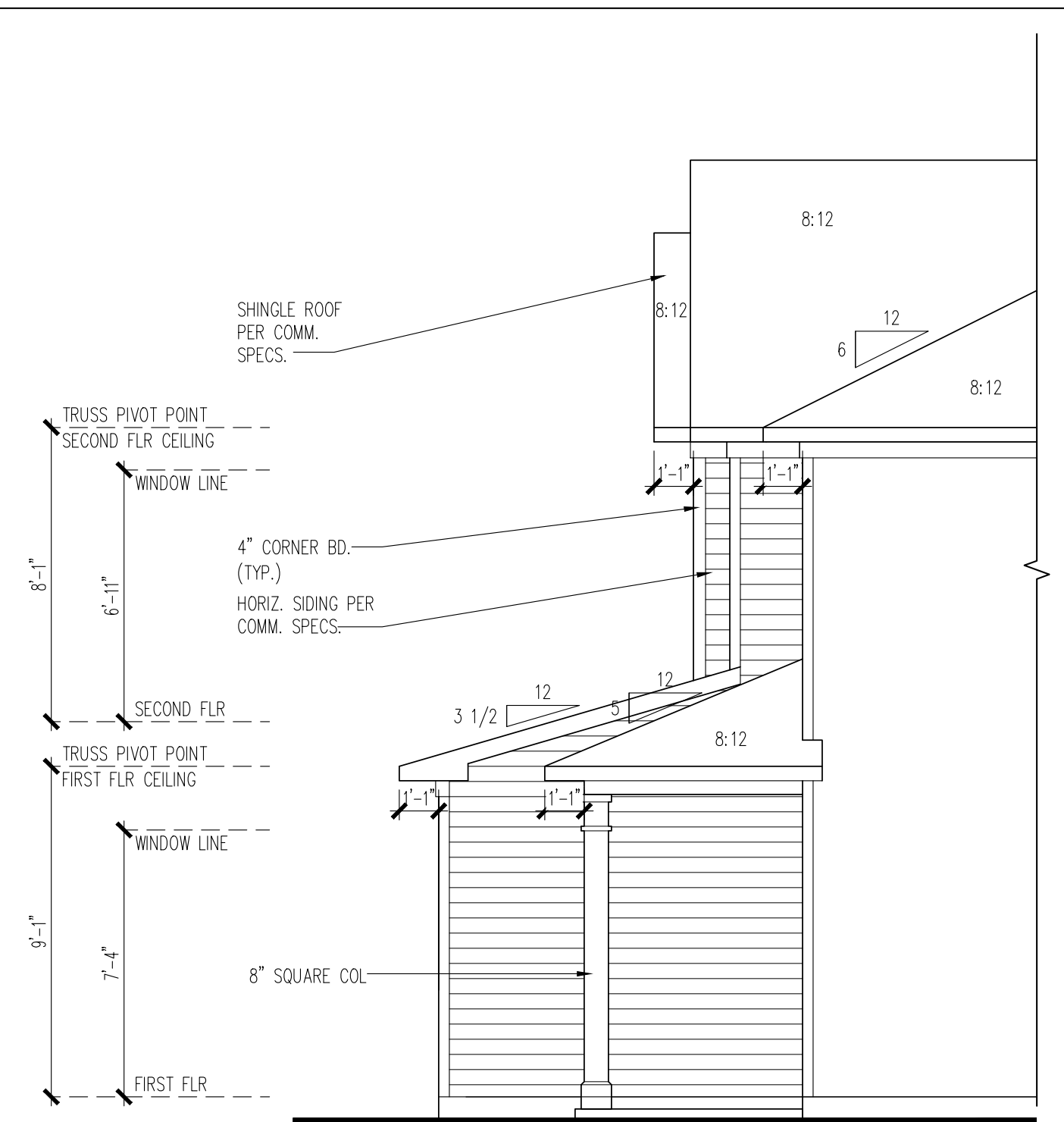
**PARTIAL LEFT SIDE ELEVATION - "LC2A"**

SCALE : 1/4" = 1'-0"



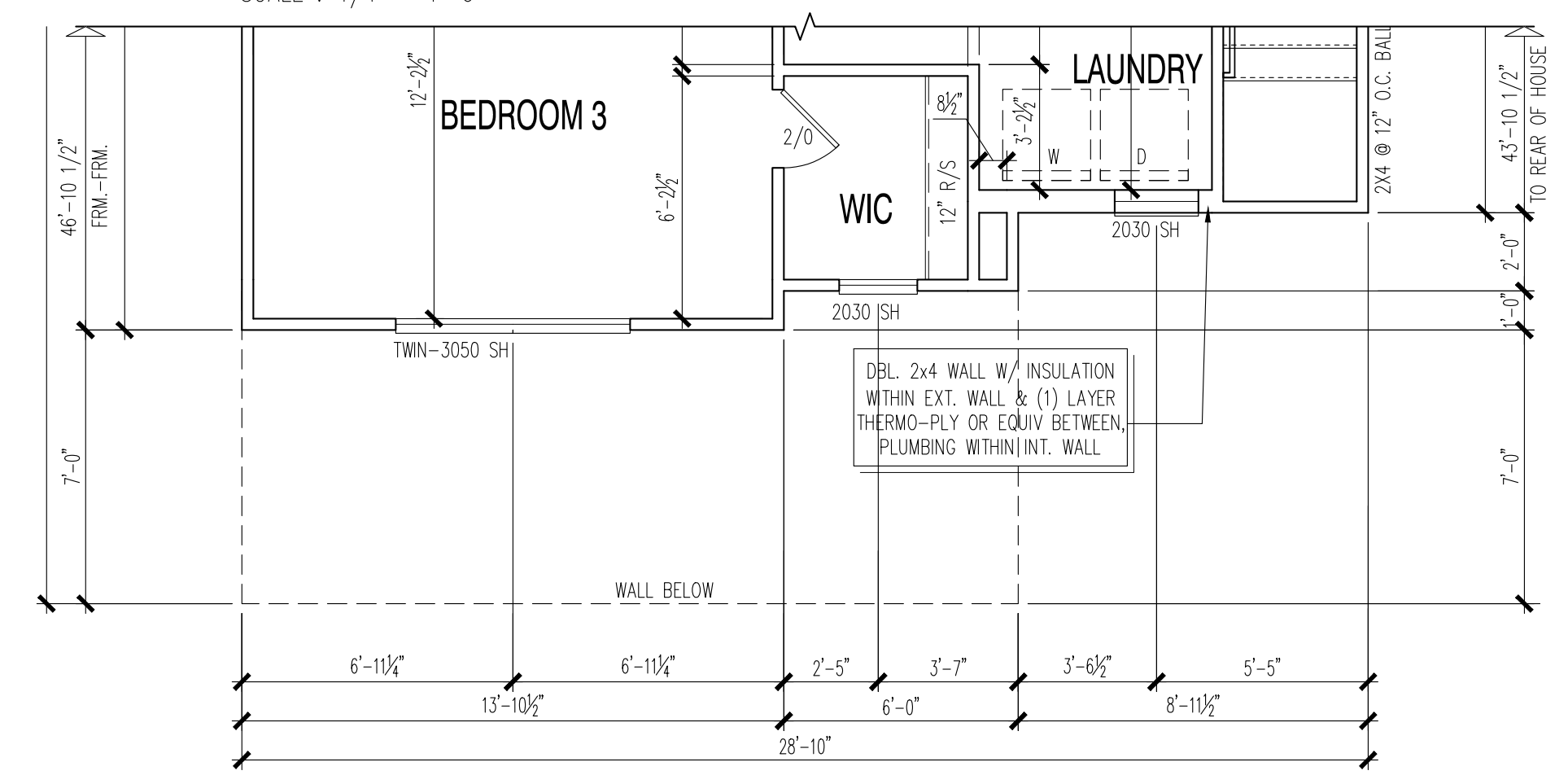
**FRONT ELEVATION - "LC2A" - FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



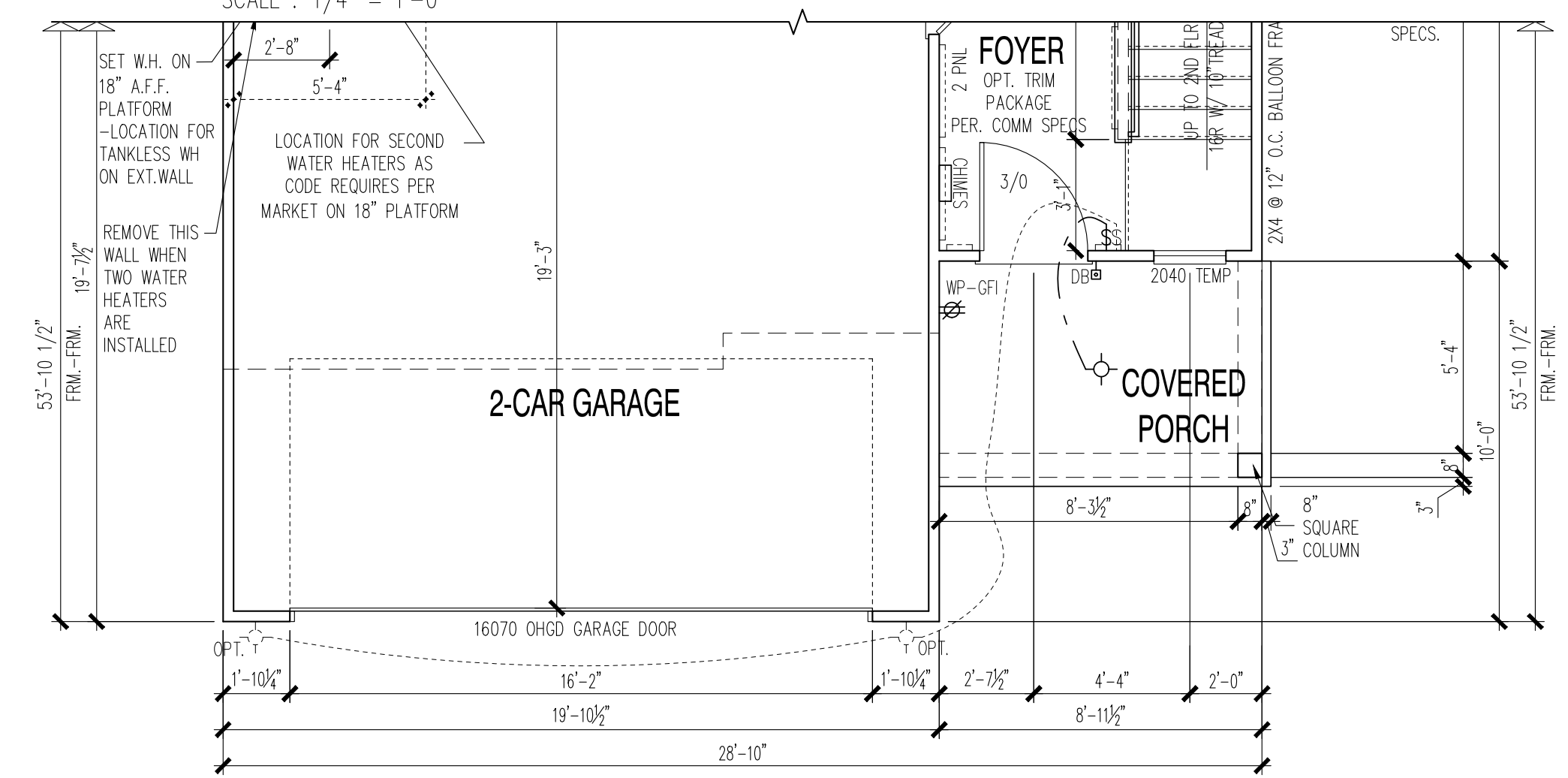
**PARTIAL RIGHT SIDE ELEVATION - "LC2A"**

SCALE : 1/4" = 1'-0"



**PARTIAL SECOND FLOOR PLAN**

SCALE : 1/4" = 1'-0"



**PARTIAL FIRST FLOOR PLAN**

SCALE : 1/4" = 1'-0"

NOTE:  
ADD 1X4 WINDBORNE  
DEBRIS TRIM AROUND ALL  
WINDOWS PER COMM SPEC

PLOTTED: November 20, 2019 / 3:11.0 FRONT ELEVATION - LC2A.dwg

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**Southeast Zone**  
2475 Northwinds Pkwy, Suite 600  
Alpharetta, GA 30009 (770) 381-3450



The Murray  
FRONT ELEVATION "LC2A"  
FRONT ENTRY GARAGE

| PRODUCT MANAGER |                  |
|-----------------|------------------|
| INITIAL RELEASE | DATE: 00/00/0000 |
| REV#            | DATE/DESCRIPTION |
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PROJECT TYPE  
**Single Family**

SPECIFICATION LEVEL  
**Pulte**

PLAN NAME  
**Murray**  
NPC NUMBER  
**8128.200**

SHEET  
**3.11.0**

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.

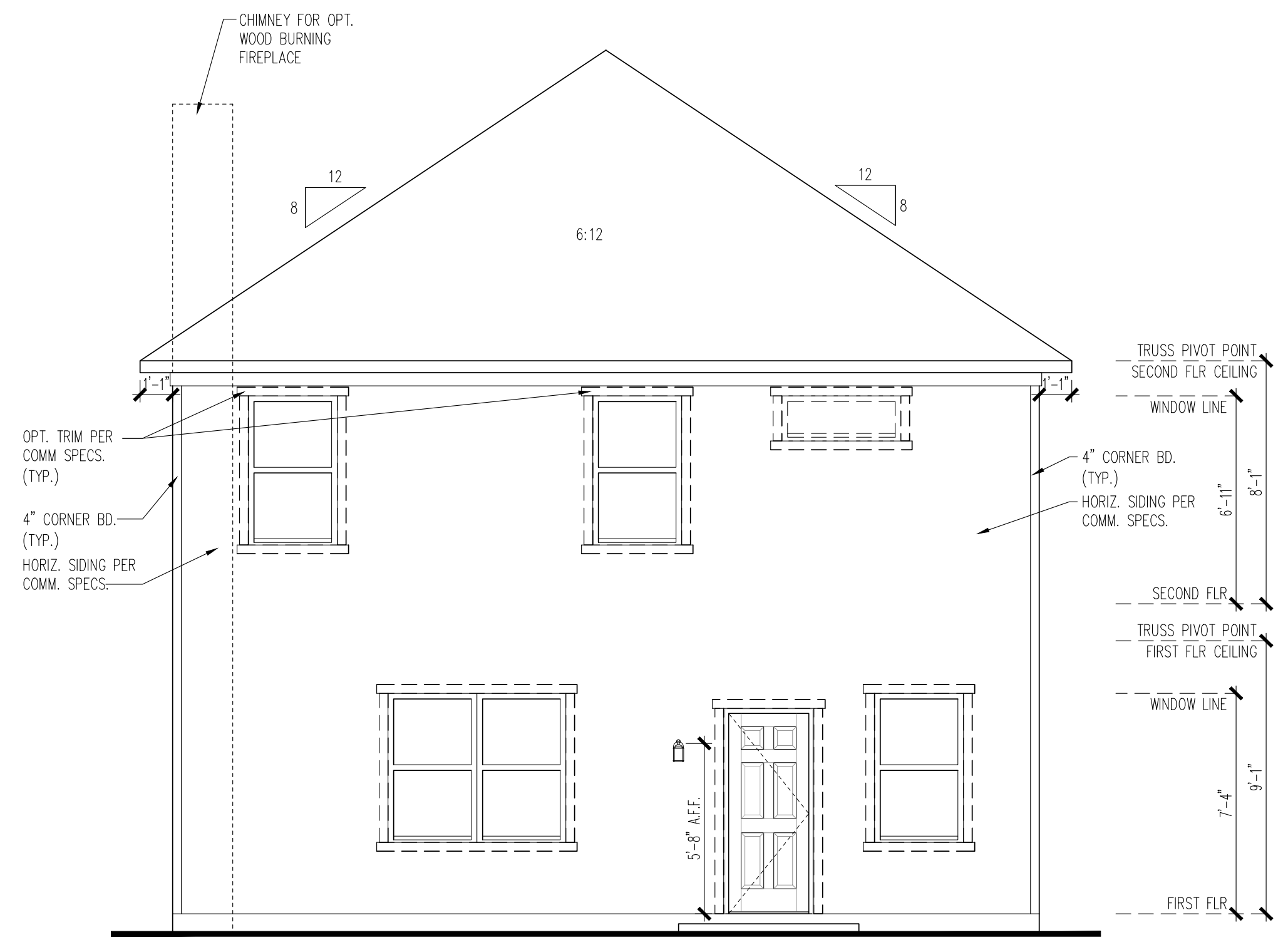
| PRODUCT MANAGER |                  |
|-----------------|------------------|
| INITIAL RELEASE | DATE: 00/00/0000 |
| REV#            | DATE/DESCRIPTION |
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|                 |                  |

PROJECT TYPE  
**Single Family**

SPECIFICATION LEVEL  
**Pulte**

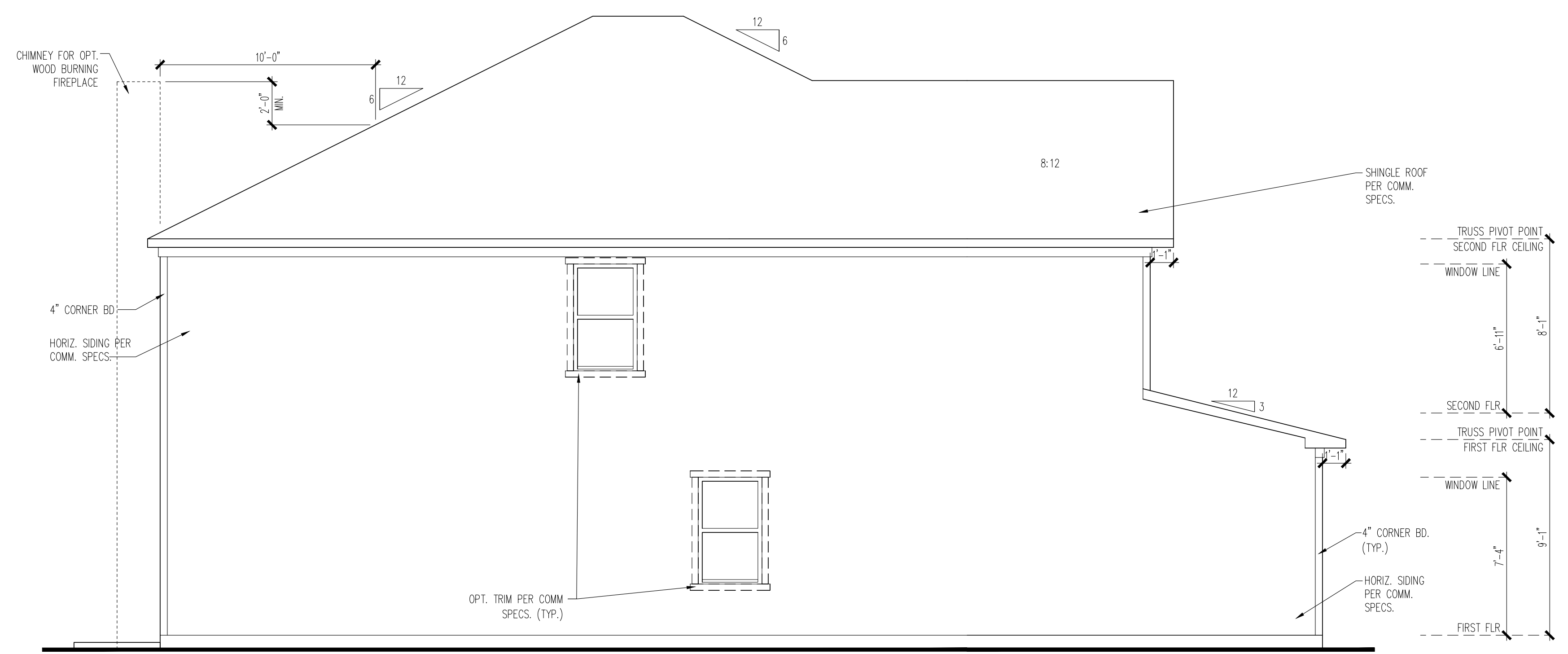
PLAN NAME  
**Murray**  
NPC NUMBER  
**8128.200**

SHEET  
**3.SR.3**



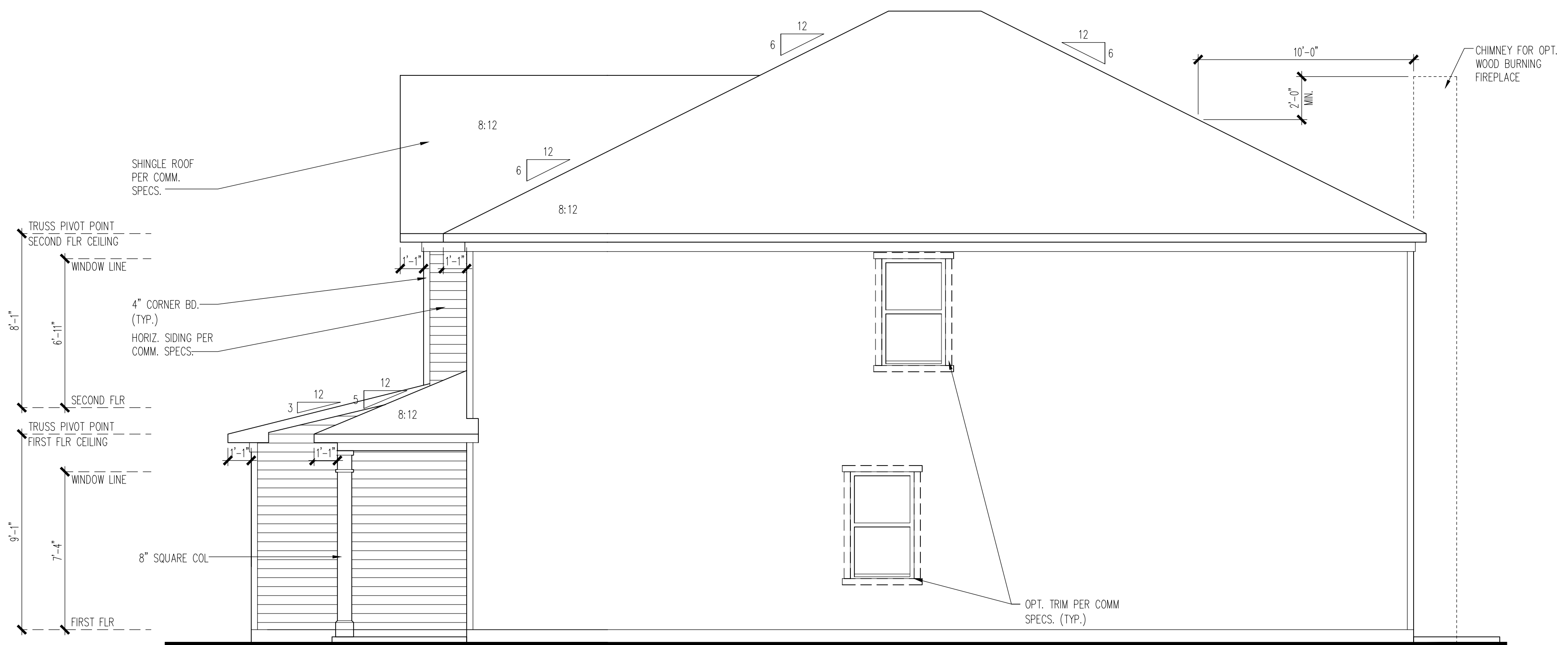
**REAR ELEVATION - "LC1A" - FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



**LEFT SIDE ELEVATION - "LC1A" - FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"



**RIGHT SIDE ELEVATION - "LC1A" - FRONT ENTRY GARAGE**

SCALE : 1/4" = 1'-0"

| REV # | DATE    | DESCRIPTION  |
|-------|---------|--------------|
| △     | 7-30-17 | ACKLEY       |
| △     | 6-21-18 | RELEASE DATE |
| △     | 1-8-19  |              |
| △     |         |              |
| △     |         |              |
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| △     |         |              |
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| △     |         |              |

PROJECT TYPE  
**SINGLE FAMILY**

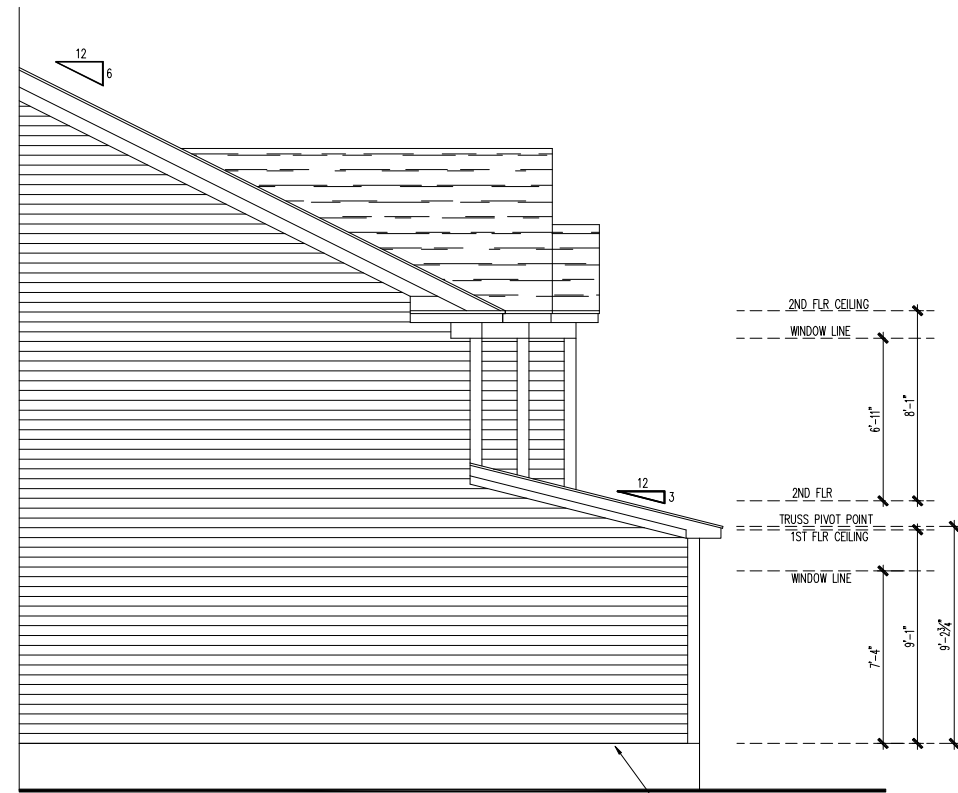
COMMUNITY NAME  
**SOUTHEAST AREA SET**  
 LAWSON COMMUNITY ID

GARAGE HANDING

SPECIFICATION LEVEL  
**P1, P2**

PLAN NAME  
**PRESTON**  
 NPC PLAN NUMBER  
 LAWSON PLAN ID  
 LEGACY PLAN NUMBER / NAME  
**same as current**

SHEET  
**3.1**



**LEFT SIDE ELEVATION**

SCALE : 1/4" = 1'-0"

18"-24" RAISED SLAB,  
 MASONRY/PAVING  
 PER COMM SPECS.



**FRONT ELEVATION "1"**

SCALE : 1/4" = 1'-0"

**ATTIC VENTILATION:** (300 SQ FT ATTIC SPACE / 1 SQ FT VENTILATION)  
 W/ 50%-80% REQ. VENTS GREATER THAN OR EQUAL TO 3" ABOVE  
 EAVE / CORNICE VENTS PER IRC R806.2

ELEVATIONS "ALL" 1180 SQ FT UNDER ROOF ATTIC /  
 300 SQ FT / 1 SQ FT = 3.93 SQ FT VENTILATION

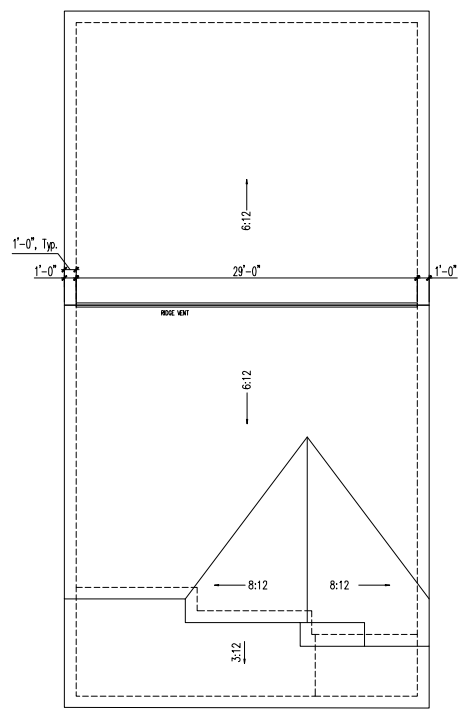
RIDGE VENT 18 SQ IN = (.125 SQ FT)  
 SOFFIT VENT 9 SQ IN = (.0625 SQ FT)

3.93 SQ FT x 50 % = 1.9675 SQ FT RIDGE, 3.93 SQ FT x 50 % = 1.9675 SQ FT SOFFIT

**RIDGE VENT**  
 1.967 SQ FT = 15.7 FEET OF RIDGE VENT  
 0.125 SQ FT

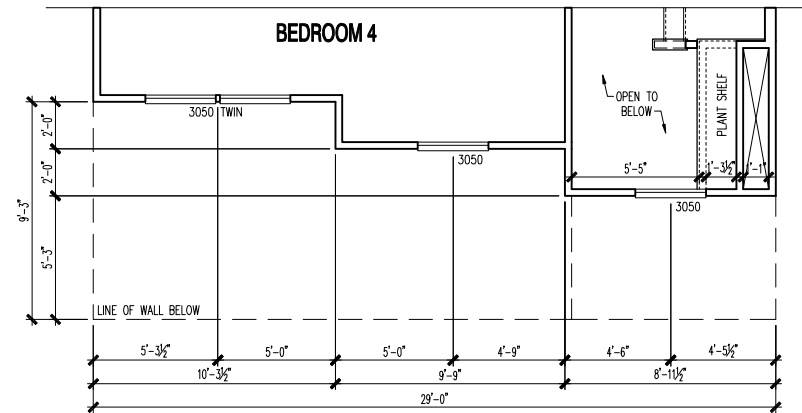
**SOFFIT VENT**  
 1.967 SQ FT = 31.5 FEET OF SOFFIT VENT  
 0.0625 SQ FT

\*CALCULATIONS REFLECT 50 % RIDGE AND 50 % SOFFIT VENTS ALLOWABLE PER SECTION IRC R806.2



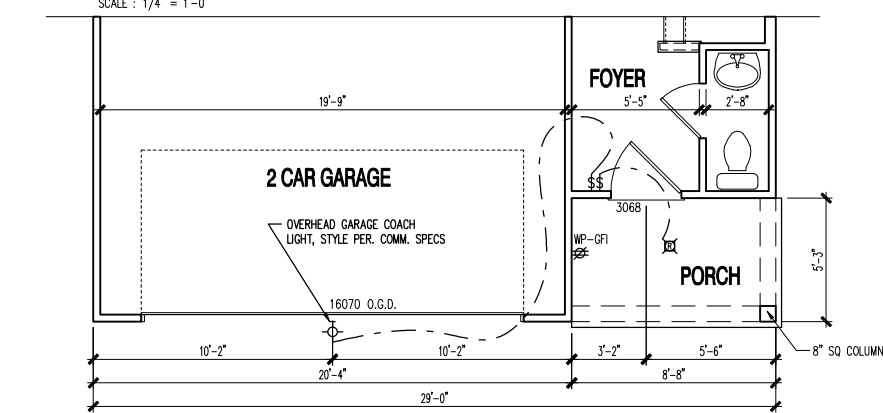
**ROOF PLAN**

SCALE : 1/8" = 1'-0"



**PARTIAL SECOND FLOOR PLAN**

SCALE : 1/4" = 1'-0"



**PARTIAL FIRST FLOOR PLAN**

SCALE : 1/4" = 1'-0"

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.



| REV # | DATE / DESCRIPTION |
|-------|--------------------|
| △     | 6-21-18            |
| △     | 1-8-19             |
| △     |                    |
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| △     |                    |
| △     |                    |
| △     |                    |
| △     |                    |

PROJECT TYPE  
**SINGLE FAMILY**

COMMUNITY NAME  
**SOUTHEAST AREA SET**  
LAWSON COMMUNITY ID

GARAGE HANDLING

SPECIFICATION LEVEL  
**P1, P2**

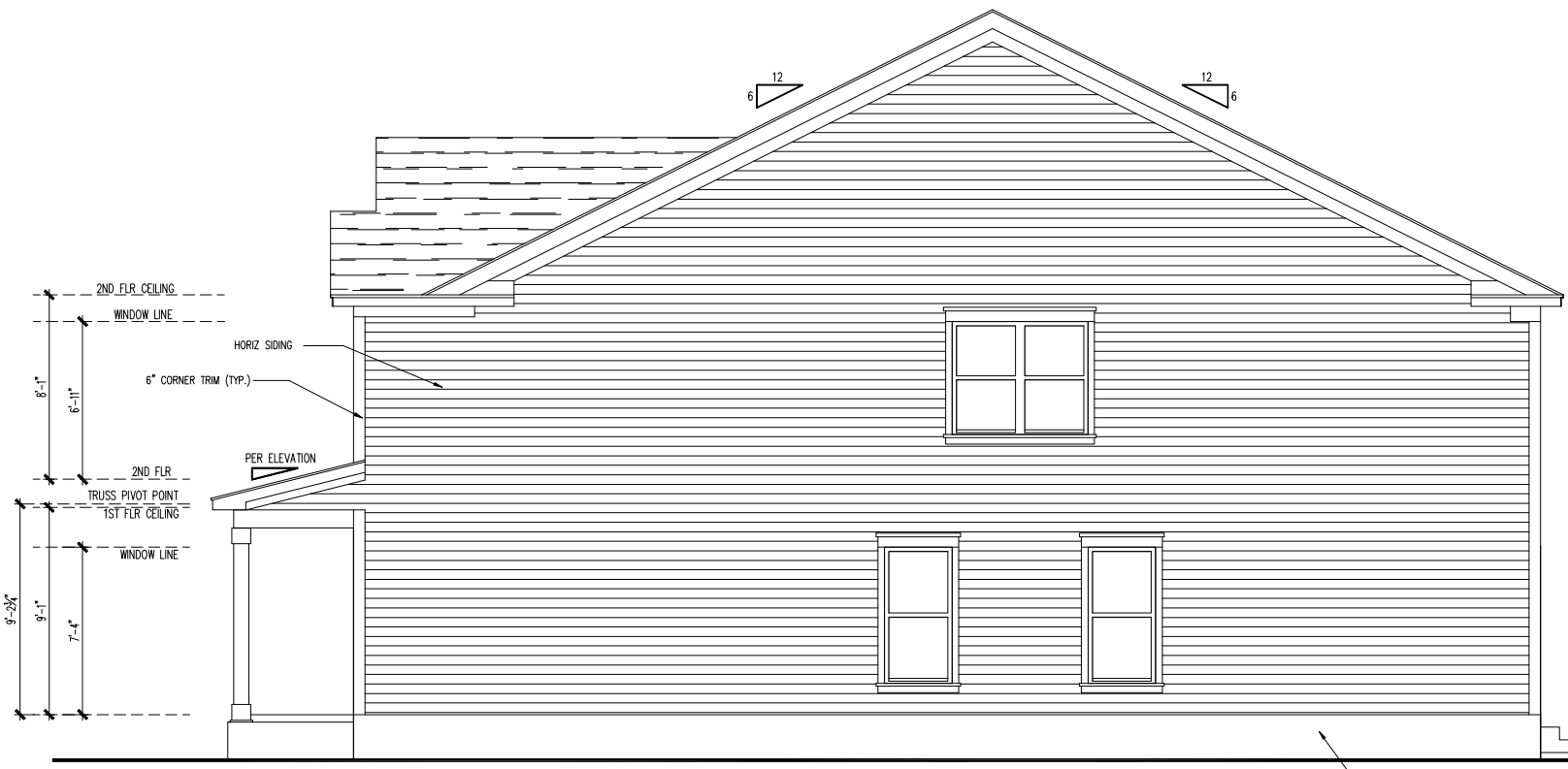
PLAN NAME  
**PRESTON**  
NPC PLAN NUMBER

LAWSON PLAN ID

LEGACY PLAN NUMBER / NAME  
**same as current**

SHEET  
**3.SR**

NOTE: SCALES NOTED ON DRAWINGS RELATE TO FULL SIZE PLOTS ON 22x34 SHEETS - 11x17 SHEETS REPRESENT 1/2 SCALE PLOTS



**RIGHT SIDE ELEVATION**

SCALE : 1/4" = 1'-0"



**REAR ELEVATION**

SCALE : 1/4" = 1'-0"



**LEFT SIDE ELEVATION**

SCALE : 1/4" = 1'-0"

Elevations are for illustrative purposes only; elevations submitted at MSP will be consistent with the architectural standards included in the PUD.

# Hackney Tract Subdivision

Apex, NC



PREPARED FOR

WithersRavenel  
c/o Nick Antrilli, PE  
115 MacKenan Drive  
Cary, NC 27511

PREPARED BY



**VHB Engineering NC, P.C. (C-3705)**  
Venture I  
940 Main Campus Drive, Suite 500  
Raleigh, NC 27606-5217  
919.829.0328

December 22, 2020



# Executive Summary

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## Project Background

There are plans to construct the proposed Hackney Tract Subdivision on the north side of Olive Chapel Road, east of the newly completed Richardson Road, in Apex, NC (Figure 1). The proposed Hackney Tract Subdivision is planned to consist of up to 100 single-family and 133 multi-family townhomes with full build-out expected in 2024. A traffic impact analysis is required by the Town of Apex and North Carolina Department of Transportation (NCDOT) to analyze the potential traffic impacts of the proposed the Hackney Tract Subdivision and to identify any necessary roadway improvements.

As shown on the conceptual site plan (Figure 2), the development will be accessed through one full movement access along Olive Chapel Road:

- Access #1: full movement access on Olive Chapel Road, approximately 2,500 feet east of Richardson Road

In addition, access will be provided via Hasse Avenue extension to the north to Richardson Road, and cross-connections will be provided via local street extensions to the west to Smith Farm.

Based on the agreement with the Town of Apex and NCDOT (Appendix A), the following existing and future intersections were included in the study and analyzed under the AM and PM peak hour conditions:

- SR 1160 (Olive Chapel Road) and SR 1145 (Richardson Road) (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and SR 1162 (Apex Barbecue Road) (unsignalized)
- Richardson Road and Hasse Avenue (unsignalized)
- US Highway 64 East at Richardson Road (unsignalized/future signalized)
- US Highway 64 West at U-turn east of Richardson Road (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and Future Access #1/Hasse Avenue Extension (full movement access)

The analysis for the Hackney Tract Subdivision was performed under three (3) scenarios: Existing (2020), No-Build (2024) and Build (2024) conditions. The Existing



(2020) scenario includes AM and PM peak hour analysis based on turning movement count data collected in November 2020. The No-Build (2024) scenario includes existing traffic, a three percent (3%) annual growth rate, and site trips generated by seven planned developments within or adjacent to the study area. The Build (2024) scenario includes No-Build (2024) volumes with the addition of site trips generated by the proposed Hackney Tract Subdivision.

---

## Existing (2020) Conditions

Existing analyses were conducted based on current roadway geometrics and intersection turning movement counts.

As reported in the Summary Level of Service (LOS) table on page v, all of the stop- and yield-controlled approaches in the study area are operating at acceptable levels of service (i.e., LOS D or better) during both the AM and PM peak hours under the Existing (2020) conditions, with an exception that the southbound approach of Richardson Road (westbound left-turn of US 64) at US 64 Eastbound operates at LOS F during both peak hours.

---

## No-Build (2024) Conditions

Based on the requirements by the Town of Apex and NCDOT, an annual growth rate of three percent (3%) was applied to the existing traffic to account for ambient growth between the base year (2020) and the future analysis year (2024). In addition, site trips generated by seven (7) planned developments in the study area were aggregated and included in the No-Build (2024) volumes. It should be noted that although significant traffic increases were expected with the inclusion of background developments, an undiscounted annual growth rate was applied to offset the impacts on traffic data collected in 2020 with COVID-19 pandemic restrictions in place.

As for transportation improvements, mitigation requirements associated with Sweetwater are expected to include two new signals and additional turn lanes along US 64 at the Richardson Road and U-turn east of Richardson Road intersections; in addition, a new signal is expected to be installed by Smith Farm at the Olive Chapel Road and Richardson Road intersection once it is warranted.

Based on the No-Build (2024) analysis, the study area is projected to experience traffic and delay increases, but the impacts will be substantially mitigated by the background transportation improvements. As a result, all of the signalized intersections and stop-controlled approaches in the study area are projected to operate at acceptable levels of service except that the stop-controlled northbound approach of Apex Barbecue Road at Olive Chapel Road is projected to decline to operate at LOS F in the PM peak hour.





## Trip Generation and Assignment

Trip generation was conducted based on the most appropriate corresponding trip generation codes included in the *ITE Trip Generation Manual, 10th Edition* and the suggested method of calculation in the NCDOT's "Rate vs. Equation" Spreadsheet. To provide a conservative analysis, no transit, walking, or bicycling reductions will be applied.

| Land Use Code            | Land Use                        | Unit   | ADT          | AM Peak Hour |            |            | PM Peak Hour |           |            |
|--------------------------|---------------------------------|--------|--------------|--------------|------------|------------|--------------|-----------|------------|
|                          |                                 |        |              | Enter        | Exit       | Total      | Enter        | Exit      | Total      |
| 210                      | Single-Family Detached Housing  | 100 du | 1,040        | 19           | 57         | 76         | 64           | 38        | 102        |
| 220                      | Multi-Family Housing (Low-Rise) | 133 du | 965          | 14           | 49         | 63         | 48           | 28        | 76         |
| <i>Development Total</i> |                                 |        | <i>2,005</i> | <i>33</i>    | <i>106</i> | <i>139</i> | <i>112</i>   | <i>66</i> | <i>178</i> |

In total, the proposed Hackney Tract Subdivision is projected to generate 2,005 daily trips with 139 trips (33 entering, 106 exiting) occurring in the AM peak hour and 178 trips (112 entering, 66 exiting) occurring the PM peak hour. The resulting site trips were distributed in accordance with the existing traffic patterns and anticipated land uses.

## Build (2024) Conditions

The Build (2024) conditions account for both the No-Build (2024) traffic and site traffic generated by the proposed Hackney Tract Subdivision.

As shown in the Summary LOS table on page v, the stop-controlled northbound approach of Apex Barbeque Road at Olive Chapel Road is projected to continue to operate at failing levels of services in the PM peak hour with delay increases. The rest of the intersections included in the study area are projected to continue operating at acceptable levels of service during both peak hours. The planned stop-controlled Future Access #1 is projected to operate at LOS C in the AM peak hour and LOS D in the PM peak hour.

## Roadway Improvement Recommendations

As indicated in the traffic operations analyses, the proposed Hackney Tract Subdivision is projected to have minimum impacts on traffic operations of the surrounding roadway network and intersections. Nevertheless, the following roadway improvements are recommended to improve traffic operations and safety:



SR 1160 (Olive Chapel Road) and Future Access #1/Hasse Avenue Extension (unsignalized, full movement)

Future Access #1 is projected to operate at acceptable levels of service during the AM and PM peak hour with a two-lane cross-section. Although traffic volumes are not projected to automatically warrant turn lanes on Olive Chapel Road, dedicated turn lanes should be provided with the required frontage widening to meet the Town of Apex Comprehensive Transportation Plan standards. Therefore, the following site access configuration and transportation improvements are recommended at this intersection:

- Construct Future Access #1 to consist of one inbound lane and one outbound lane.
- Provide a dedicated left-turn lane on eastbound Olive Chapel Road with 100 feet of storage length and appropriate taper.
- Provide a dedicated right-turn lane on westbound Olive Chapel Road with 100 feet of storage length and appropriate taper.

SR 1160 (Olive Chapel Road) and SR 1162 (Apex Barbecue Road) (unsignalized)

Traffic analysis indicated that the northbound approach of Apex Barbecue Road is projected to operate at LOS F in the PM peak hour under the No-Build and Build conditions. The intersection is not anticipated to meet warrants for installing a new traffic signal, while options for adding new turn lanes are limited due to the skewed angle of intersection on a curve of Olive Chapel Road and potential right-of-way/drainage restrictions. As shown on the Apex Comprehensive Transportation Plan, this intersection is identified for future intersection realignment. Since site trips are anticipated to contribute less than 4% traffic increases in the AM and 3% in the PM at this intersection (increases of only 1 VPH in the AM peak hour and 2 VPH in the PM peak on the stop-controlled approach), improvement should not be required by this development based on the Town of Apex UDO. Nevertheless, alternative traffic control method (such as AWSC), if warranted by crash analysis, may be considered before this intersection is realigned in the future based on the Town of Apex CTP.

The rest of study area intersections are expected to operate acceptably. Therefore, no mitigation is required.



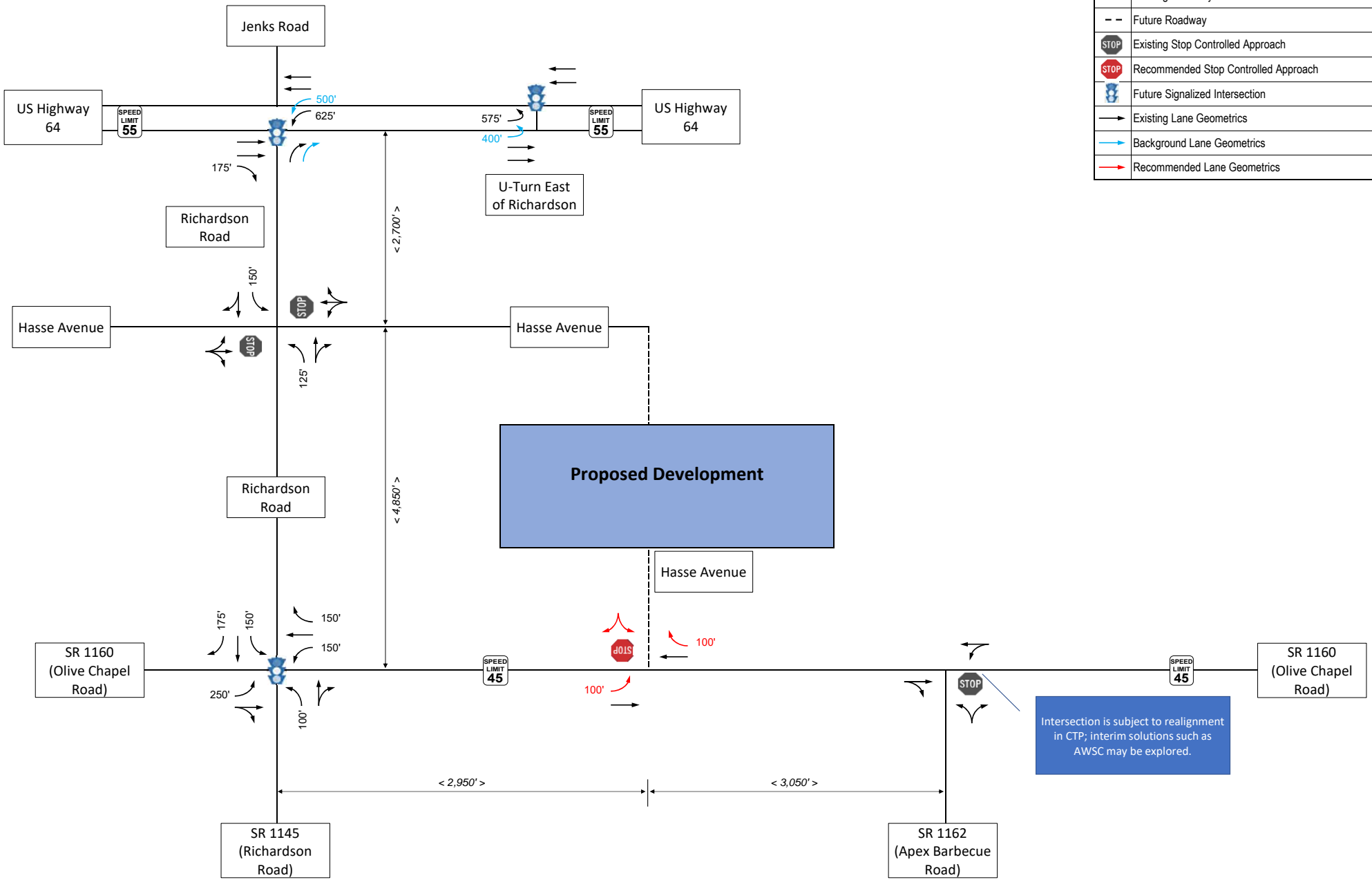
### Summary Level of Service Table

| Intersection and Approach                               | Control         | Existing (2020) |         | No-Build (2024)     |                     | Build (2024)        |                     |
|---|-----------------|-----------------|---------|---------------------|---------------------|---------------------|---------------------|
|   |                 | AM              | PM      | AM                  | PM                  | AM                  | PM                  |
| <b>Richardson Rd and Olive Chapel Rd</b>                | TWSC/<br>Signal | -               | -       | <b>A<br/>(9.7)</b>  | <b>B<br/>(11.8)</b> | <b>A<br/>(9.8)</b>  | <b>B<br/>(12.0)</b> |
| Eastbound   |                 | ---             | ---     | A-9.7               | B-10.7              | A-9.8               | B-10.9              |
| Westbound   |                 | ---             | ---     | B-10.3              | B-12.0              | B-10.5              | B-12.2              |
| Northbound  |                 | B-11.9          | B-14.1  | B-10.2              | B-12.7              | B-10.3              | B-13.0              |
| Southbound  |                 | B-11.7          | C-15.5  | A-8.4               | B-11.5              | A-8.5               | B-11.6              |
| <b>Apex Barbecue Rd and Olive Chapel Rd</b>             | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Northbound  |                 | B-11.8          | C-19.5  | C-16.8              | F-92.5              | C-17.9              | F-134.5             |
| <b>Richardson Rd and Little Gem Ln/Hasse Ave</b>        | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Eastbound   |                 | A-9.8           | B-10.2  | C-16.5              | C-21.8              | C-19.1              | D-32.0              |
| Westbound   |                 | A-9.7           | A-9.9   | C-15.1              | C-19.1              | C-17.0              | C-21.9              |
| <b>Richardson Rd/WB Left-Over and US 64</b>             | TWSC/<br>Signal | -               | -       | <b>C<br/>(20.7)</b> | <b>D<br/>(42.0)</b> | <b>C<br/>(22.0)</b> | <b>D<br/>(44.5)</b> |
| Eastbound   |                 | ---             | ---     | C-20.7              | D-51.3              | C-23.7              | E-56.0              |
| Northbound  |                 | C-23.5          | C-23.3  | C-28.2              | D-47.4              | C-28.5              | D-50.1              |
| Southbound  |                 | F-66.0          | F-216.7 | B-10.9              | B-19.6              | A-9.8               | B-19.5              |
| <b>U-Turn East of Richardson Rd and US 64</b>           | TWSC/<br>Signal | -               | -       | <b>B<br/>(11.8)</b> | <b>C<br/>(27.6)</b> | <b>B<br/>(12.5)</b> | <b>C<br/>(30.9)</b> |
| Westbound   |                 | ---             | ---     | A-9.6               | C-20.5              | B-10.5              | C-24.1              |
| Northbound  |                 | B-14.2          | C-18.2  | C-27.8              | E-59.9              | C-26.5              | E-62.1              |
| <b>Olive Chapel Rd &amp; Hasse Ave/Future Access #1</b> | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Southbound  |                 | ---             | ---     | ---                 | ---                 | C-16.1              | D-25.0              |

LEGEND: X (XX) = Overall intersection LOS (intersection delay in sec/veh);

X - XX = approach LOS - approach delay in sec/veh

| LEGEND |                                      |
|--------|--------------------------------------|
| —      | Existing Roadway                     |
| - -    | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Recommended Stop Controlled Approach |
|        | Future Signalized Intersection       |
|        | Existing Lane Geometrics             |
|        | Background Lane Geometrics           |
|        | Recommended Lane Geometrics          |



**Figure ES**  
**Future (2024) Lane Geometrics and Traffic Control**

**Hackney Tract Subdivision**  
**Apex, NC**





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# 1

## Introduction

There are plans to construct the proposed Hackney Tract Subdivision on the north side of Olive Chapel Road, east of the newly completed Richardson Road, in Apex, NC (Figure 1). The proposed Hackney Tract Subdivision is planned to consist of up to 100 single-family and 133 multi-family townhomes with full build-out expected in 2024.

As shown on the conceptual site plan (Figure 2), the development will be accessed through one full movement access along Olive Chapel Road:

- Access #1: full movement access on Olive Chapel Road, approximately 2,500 feet east of Richardson Road

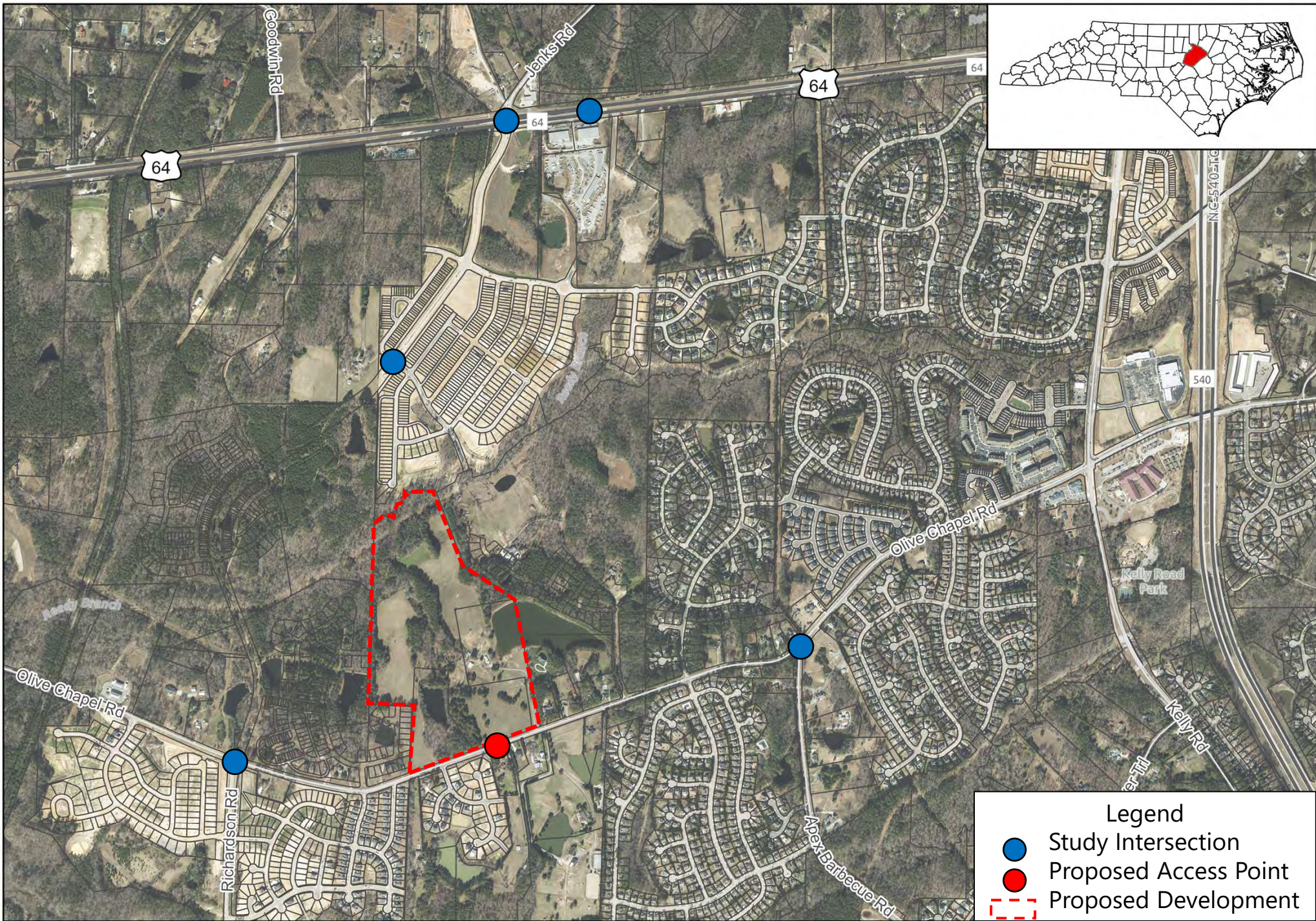
In addition, access will be provided via Hasse Avenue extension to the north to Richardson Road, and cross-connections will be provided via local street extensions to the west to Smith Farm.

Based on the agreement with the Town of Apex and NCDOT (Appendix A), the following existing and future intersections were included in the study and analyzed under the AM and PM peak hour conditions:

- SR 1160 (Olive Chapel Road) and SR 1145 (Richardson Road) (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and SR 1162 (Apex Barbecue Road) (unsignalized)
- Richardson Road and Hasse Avenue (unsignalized)
- US Highway 64 East at Richardson Road (unsignalized/future signalized)
- US Highway 64 West at U-turn east of Richardson Road (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and Future Access #1/Hasse Avenue Extension (full movement access)

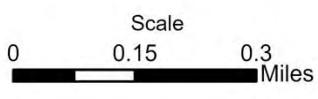
VHB Engineering NC, P.C. (VHB) is contracted with the development team to analyze the potential traffic impacts of the proposed development and to identify any necessary roadway improvements. This Traffic Impact Analysis (TIA) summarizes trip generation, distribution, traffic assignment, and traffic analyses for the proposed development. The Memorandum of Understanding, which summarizes the assumptions for the study is included in Appendix A.





**Legend**

- Study Intersection
- Proposed Access Point
- Proposed Development

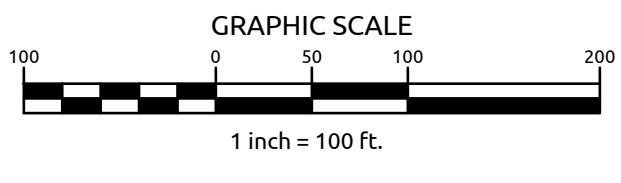
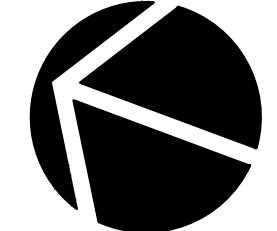


**Figure 1:**  
Vicinity Map

Hackney Tract Subdivision  
Traffic Impact Analysis  
Apex, NC







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**HACKNEY TRACT  
 SUBDIVISION**  
 APEX, NORTH CAROLINA

**OVERALL SUBDIVISION  
 PLAN**

Job No. 02180517\_20 Drawn By WR  
 Date 10/19/20 Designer WR

**PRELIMINARY  
 NOT APPROVED FOR  
 CONSTRUCTION**

| Revisions |
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## Existing (2020) Conditions

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### Existing Roadway Conditions

This section describes the existing roadways in the vicinity of the proposed development. Annual Average Daily Traffic (AADT) data for the surrounding network of roadway were obtained from the North Carolina Department of Transportation (NCDOT). The most recent AADT counts from the NCDOT are for 2019 on the study area roadways.

#### Olive Chapel Road (SR 1160)

- Olive Chapel Road is a two-lane undivided road within the study area. The posted speed limit along this roadway is 45 miles per hour (mph).
- As shown on the Town of Apex Thoroughfare and Collector Street Plan (last amended October 2020), Olive Chapel Road is planned to be widened to a 4-lane thoroughfare with median across the study area.
- The 2019 NCDOT AADT along Olive Chapel Road was 2,500 vehicles per day (vpd) between New Hill Olive Chapel Road and Kelly Road.

#### Richardson Road (SR 1145)

- Richardson Road is a new two-lane median divided roadway connecting US Highway 64 and Olive Chapel Road within the study area. The posted speed limit along this roadway is 45 mph.
- As shown on the Town of Apex Thoroughfare and Collector Street Plan, Richardson Road is planned to be widened to a 4-lane thoroughfare with median across the study area.
- The 2019 AADT along Richard Road was 810 vpd south of Olive Chapel Road. No AADT information is available for Richardson Road between Olive Chapel Road and US 64.

#### Apex Barbecue Road (SR 1162)

- Apex Barbecue Road is a two-lane undivided roadway south of the project site within the study area. The posted speed limit along this roadway is 45 mph.
- As shown on the Town of Apex Thoroughfare and Collector Street Plan, Apex Barbeque Road is planned to be widened to a 3-lane thoroughfare with intersection realignment planned at Olive Chapel Road.
- The 2019 NCDOT AADT along Apex Barbeque Road was 4,500 vpd between Kelly Road and Olive Chapel Road.



### US Highway 64 (US 64)

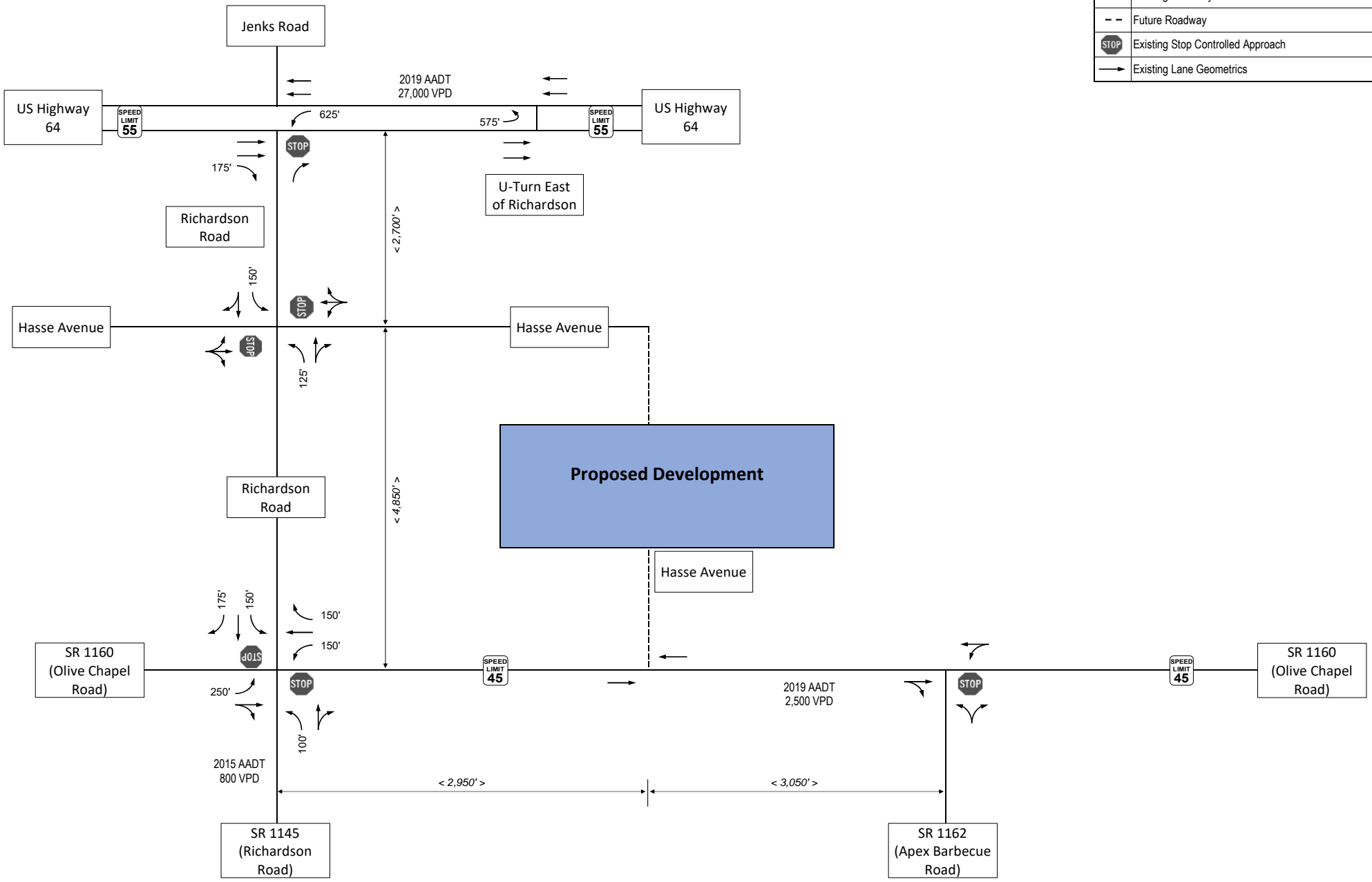
- US Highway 64 is a four-lane median divided highway with partial control of access within the study area. The posted speed limit along US 64 is 55 mph.
- As shown on the Town of Apex Thoroughfare and Collector Street Plan, US Highway 64 is planned to be a freeway facility with full control of access, and a future interchange is planned along US 64 with Richardson Road/Jenks Road.
- The 2019 NCDOT AADT along US 64 was 27,000 vpd between New Hill Road and Kelly Road.

### Hasse Avenue

- Hasse Avenue is a two-lane undivided local road within the study area. No posted speed limit was observed along Hasse Avenue.
- As shown on the Town of Apex Thoroughfare and Collector Street Plan, Hasse Avenue is planned to be extended to a two-lane major collector street between Richardson Road and Olive Chapel Road.
- No AADT information is available for Hasse Avenue within the study area.

Figure 3 provides a schematic diagram of the roadways near the proposed development including the existing intersection geometrics.

| LEGEND |                                   |
|--------|-----------------------------------|
|        | Existing Roadway                  |
|        | Future Roadway                    |
|        | Existing Stop Controlled Approach |
|        | Existing Lane Geometrics          |



**Figure 3**  
**Existing (2020) Lane Geometrics and Traffic Control**







## Existing Turning Movement Data

VHB Engineering NC, P.C. collected the intersection turning movement counts analyzed in this TIA in November 2020. Traffic data were collected during typical AM (7:00 – 9:00 AM) and PM (4:00 – 6:00 PM) peak periods while schools were partially open due to the COVID-19 pandemic restrictions. Table 1 summarizes the schedule used to obtain the turning movement data. A detailed summary of the traffic counts can be found in Appendix B.

**Table 1: Weekday Peak Hour Turning Movement Count Schedule**

| Intersection                                     | Time Period                            | Data Collection Date         |
|--|--|------------------------------|
| Olive Chapel Road and Richardson Road            | 7:00 AM – 9:00 AM<br>4:00 PM – 6:00 PM | Thursday<br>November 5, 2020 |
| Richardson Road and Hasse Avenue/Little Gem Lane | 7:00 AM – 9:00 AM<br>4:00 PM – 6:00 PM | Thursday<br>November 5, 2020 |
| US Highway 64 and Richardson Road                | 7:00 AM – 9:00 AM<br>4:00 PM – 6:00 PM | Thursday<br>November 5, 2020 |
| US Highway 64 and U-Turn East of Richardson Road | 7:00 AM – 9:00 AM<br>4:00 PM – 6:00 PM | Thursday<br>November 5, 2020 |
| Olive Chapel Road and Apex Barbecue Road         | 7:00 AM – 9:00 AM<br>4:00 PM – 6:00 PM | Thursday<br>November 5, 2020 |

The existing peak hour turning movement volumes are shown in Figure 4.

## Level of Service Criteria

Peak hour level of service (LOS) measures the adequacy of the intersection geometrics and traffic controls of a particular intersection or approach for the given turning volumes. Levels of service range from A through F, based on the average control delay experienced by vehicles traveling through the intersection during the peak hour. Control delay represents the portion of total delay attributed to traffic control devices (e.g., signals or stop signs). Table 2 provides a general description of various levels of service categories and delay ranges.



**Table 2: Level of Service Standard for Intersections**

| Level of Service | Signalized Intersection | Unsignalized Intersection |
|------------------|-------------------------|---------------------------|
| A                | <= 10 sec.              | <= 10 sec.                |
| B                | 10-20 sec.              | 10-15 sec.                |
| C                | 20-35 sec.              | 15-25 sec.                |
| D                | 35-55 sec.              | 25-35 sec.                |
| E                | 55-80 sec.              | 35-50 sec.                |
| F                | > 80 sec.               | > 50 sec.                 |

The engineering profession generally accepts LOS D as an acceptable operating condition for signalized intersections. Based on the Policy on Street and Driveway Access to North Carolina Highways (NCDOT Driveway Manual) and the Town of Apex Unified Development Ordinance (UDO), geometric and/or traffic control improvements should be identified at signalized intersections to prevent the traffic generated by the proposed development from causing any intersection or roadway approach to fall below LOS D. For intersections projected to operate worse than LOS D under the background conditions, improvements should be identified to minimize the increase in average overall intersection delay when site traffic accounts for at least 10% of the projected total peak hour traffic at the intersections.

At unsignalized intersections, stop-controlled minor street approaches may exceed LOS D provided the addition of development traffic is not anticipated to warrant a traffic signal upon build-out and the resulting congestion does not block traffic movements at adjacent intersections. Guidelines provided by NCDOT shall be used in the evaluation of the need for and length of exclusive right and/or left turn lanes to support development traffic; for any and all turning movements where the development is anticipated to add at least 10% to the existing peak hour traffic volume, improvements may be required to mitigate the impact of development traffic on turn lane storage requirements.

---

## Level of Service Analysis

Intersection levels of service analyses were performed for the typical weekday AM and PM peak hours using *Synchro/SimTraffic Professional Version 10*. A summary of the findings for the Existing (2020) scenario LOS analysis can be found in Table 3 and the full *Synchro/HCS* output can be found in Appendix D.

As reported in Table 3, all of the stop- and yield-controlled approaches in the study area are operating at acceptable levels of service (i.e., LOS D or better) during both the AM and PM peak hours under the Existing (2020) conditions, with an exception that the southbound approach of Richardson Road (westbound left-turn of US 64) at US 64 Eastbound operates at LOS F during both peak hours.



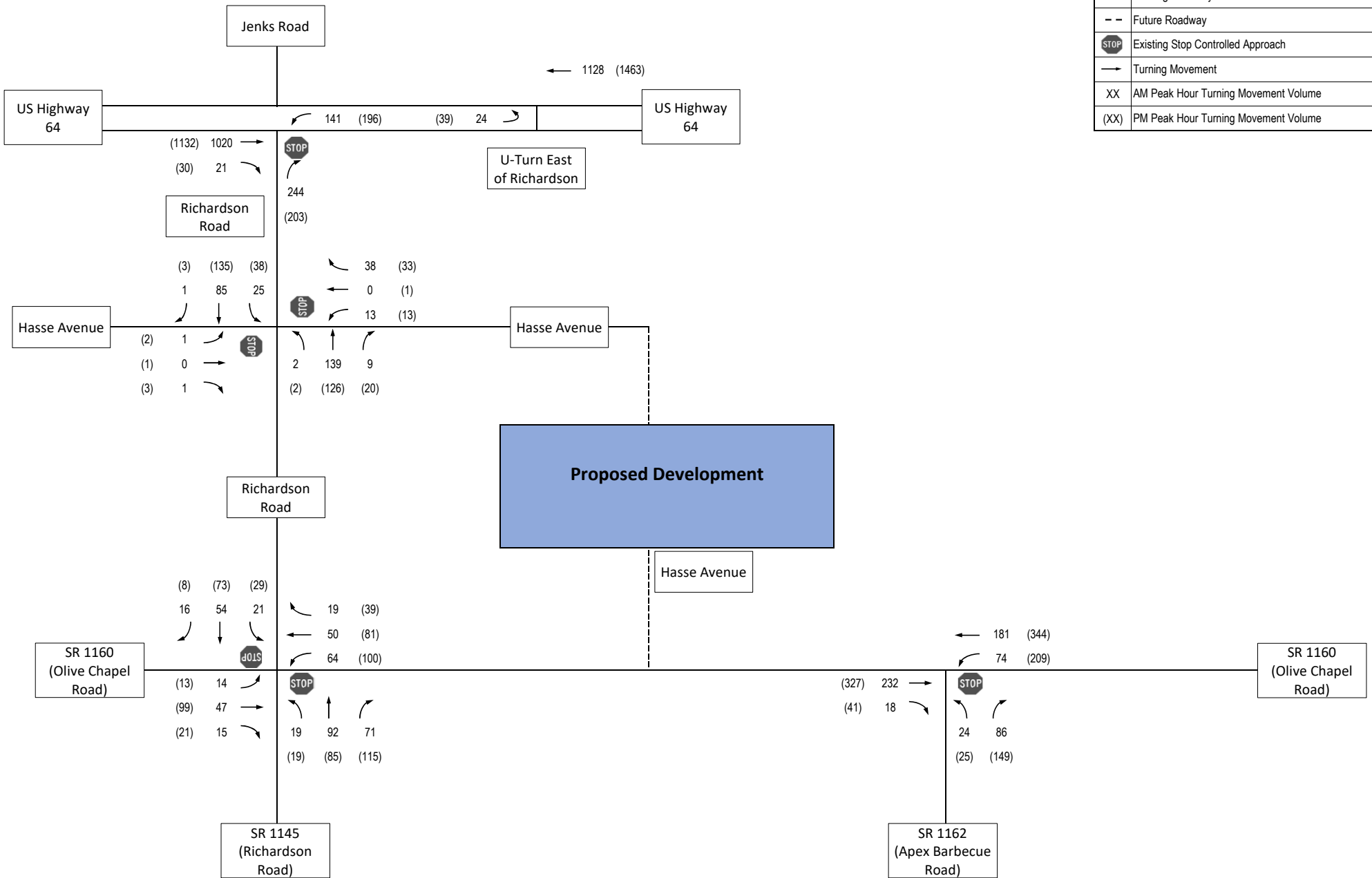
**Table 3: Existing (2020) LOS Results**

| Intersection and Approach                        | Control | Existing (2020) |         |
|--|---------|-----------------|---------|
|  |         | AM              | PM      |
| <b>Richardson Rd and Olive Chapel Rd</b>         | TWSC    | -               | -       |
| Northbound                                       |         | B-11.9          | B-14.1  |
| Southbound                                       |         | B-11.7          | C-15.5  |
| <b>Apex Barbecue Rd and Olive Chapel Rd</b>      | TWSC    | -               | -       |
| Northbound                                       |         | B-11.8          | C-19.5  |
| <b>Richardson Rd and Little Gem Ln/Hasse Ave</b> | TWSC    | -               | -       |
| Eastbound  |         | A-9.8           | B-10.2  |
| Westbound  |         | A-9.7           | A-9.9   |
| <b>Richardson Rd/WB Left-Over and US 64</b>      | TWSC    | -               | -       |
| Northbound                                       |         | C-23.5          | C-23.3  |
| Southbound                                       |         | F-66.0          | F-216.7 |
| <b>U-Turn East of Richardson Rd and US 64</b>    | TWSC    | -               | -       |
| Northbound                                       |         | B-14.2          | C-18.2  |

LEGEND: X (XX) = Overall intersection LOS (intersection delay in sec/veh);

X - XX = approach LOS - approach delay in sec/veh

| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure 4**  
Existing (2020) AM and PM Peak Hour Turning Movement Volumes





## No-Build (2024) Conditions

---

### Background Growth and Development

Based on discussions with the Town of Apex and NCDOT, an annual growth rate of three percent (3%) was applied to the existing traffic to account for the growth between the base year (2020) and the future analysis year (2024). In addition, site trips from seven (7) adjacent developments that are expected to occur before the analysis year were incorporated into the analysis.

*Saddlebrook (Lawrence Assemblage/Richardson West)* – Located in the southwest corner of the Olive Chapel Road and Richardson Road intersection, this residential development is proposed to consist of 104 single-family homes and be constructed by 2017. A traffic analysis report was prepared by Ramey Kemp & Associates and submitted to the Town on November 3, 2014. As detailed in the report, the development is projected to generate 1,090 daily site trips, with 83 trips (21 entering, 62 exiting) occurring in the AM peak hour and 109 trips (69 entering, 40 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicate that construction has begun but has not been completed; therefore, a percentage of traffic associated with the development was included in the No-Build (2024) analysis.

*Sweetwater* – Located on US 64 in Wake County, this mixed-use development is projected to consist of 375 single-family homes, 60 condominiums, 50,000 sf of office, 200,000 sf of retail, 7,000 sf of high-turnover restaurant, 3,000 sf of fast food with drive through window, and a drive-in bank with 4 lanes and be constructed by 2019. A TIA was prepared by Ramey Kemp & Associates and submitted on December 18, 2014. As detailed in the report the development is projected to generate 18,360 daily site trips, with 914 trips (457 entering, 457 exiting) occurring in the AM peak hour and 1,736 trips (865 entering, 871 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicate that approximately 80% of the residential and 0% of the mixed-use phases have been constructed; therefore, a percentage of traffic associated with the development was included in the No-Build (2024) analysis.

*Buckhorn Preserve (Goodwin-MacNair)* – Located on the east side of Richardson Road, just north of M. Zion Church Road, this residential development is projected to consist of 347 single-family homes and be constructed by 2020. A TIA was prepared by VHB



and submitted to the Town on June 26, 2015, with an addendum submitted on August 3, 2015. As detailed in the report, the development is projected to generate 3,299 daily site trips, with 253 trips (63 entering, 190 exiting) occurring in the AM peak hour and 322 trips (203 entering, 119 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicate that the development has not been fully constructed; therefore, a percentage of the traffic associated with the development was included in the No-Build (2024) analysis.

*Stillwater (Womble)* – Located between Ragan Road and Richardson Road north of Humie Olive Road, this residential development is projected to consist of 303 single-family homes and be constructed by 2018. A TIA was prepared by Stantec and submitted to the Town on February 27, 2014. As detailed in the report, the development is projected to generate 2,912 daily site trips, with 221 trips (55 entering, 166 exiting) occurring in the AM peak hour and 285 trips (180 entering, 105 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicated that the development has not been fully constructed; therefore, a percentage of the traffic associated with the development was included in the No-Build (2024) analysis.

*Westford* – Located on the north side of US 64 and east of Jenks Road, this residential development is projected to consist of 300 apartment units, 225 townhomes, and 90 single-family homes and be constructed by 2019. A TIA was prepared by Kimley-Horn and submitted to the Town on December 7, 2016. As detailed in the report, the development is projected to generate 4,188 daily site trips, with 323 trips (65 entering, 258 exiting) occurring in the AM peak hour and 396 trips (257 entering, 139 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicated that the development has not been fully constructed; therefore, a percentage of the traffic associated with the development was included in the No-Build (2024) analysis.

*Smith Farm* – Located north of Olive Chapel Road, west of Kelly Road, and south of US 64, this mixed-use development is projected to consist of 430 single-family homes, 170 townhomes, 150 apartments, 100,000 sf of office, 150,000 sf of retail, 10,000 sf of pharmacy, 16,000 sf of high-turnover sit-down restaurant, 9,000 sf of fast-food restaurant, 12,000 sf of drive-in bank, and a gas station with 8 fueling positions and be constructed by 2021. A TIA was prepared by Ramey Kemp & Associates and submitted to the Town on November 24, 2015. As detailed in the report, the development is projected to generate 27,930 daily site trips, with 1,709 trips (847 entering, 862 exiting) occurring in the AM peak hour and 2,545 trips (1,301 entering, 1,244 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicated that the development has not been fully constructed; therefore, a percentage of the traffic associated with the development was included in the No-Build (2024) analysis.



*Linden (Pricewood Assemblage)* – Located in the northwest quadrant of the intersection of Olive Chapel Road and Pricewood Lane, this residential development is projected to consist of 211 single-family homes and be constructed by 2022. A TIA was prepared by Ramey Kemp & Associates and submitted to the Town on August 31, 2016. As detailed in the report, the development is projected to generate 2,010 daily site trips, with 158 trips (40 entering, 118 exiting) occurring in the AM peak hour and 211 trips (133 entering, 78 exiting) occurring in the PM peak hour. These trips were distributed to the study area based on the assumed distribution patterns in the report. Field visits indicated that the development has not been fully constructed; therefore, a percentage of the traffic associated with the development was included in the No-Build (2024) analysis.

As for transportation improvements, mitigation requirements associated with Sweetwater are expected to include two new signals and additional turn lanes along US 64 at the Richardson Road and U-Turn East of Richardson Road intersections, and Smith Farm is committed to installing a new signal at the Olive Chapel Road and Richardson Road intersection once it is warranted.

Note that although significant traffic increases are expected due to the inclusion of background developments, an undiscounted annual traffic growth rate of three percent (3%) was applied to offset the impacts on traffic data collected under the Existing (2020) conditions with COVID-19 pandemic restrictions in place. The No-Build (2024) AM and PM peak hour volumes are shown in Figure 5.

---

## Level of Service Analysis

Intersection levels of service analyses were performed for the typical weekday AM and PM peak hours using *Synchro/SimTraffic Professional Version 10*. A summary of the findings for the No-Build (2024) scenario LOS analysis can be found in Table 4. The full *Synchro/HCS* output for the No-Build scenario can be found in Appendix D.

As reported in Table 4, the study area is projected to experience traffic and delay increases, but the impacts will be substantially mitigated by the background transportation improvements. As a result, all of the signalized intersections and stop-controlled approaches in the study area are projected to operate at acceptable levels of service except that the stop-controlled northbound approach of Apex Barbecue Road at Olive Chapel Road is projected to decline to operate at LOS F in the PM peak hour.



Table 4: No-Build (2024) LOS Results

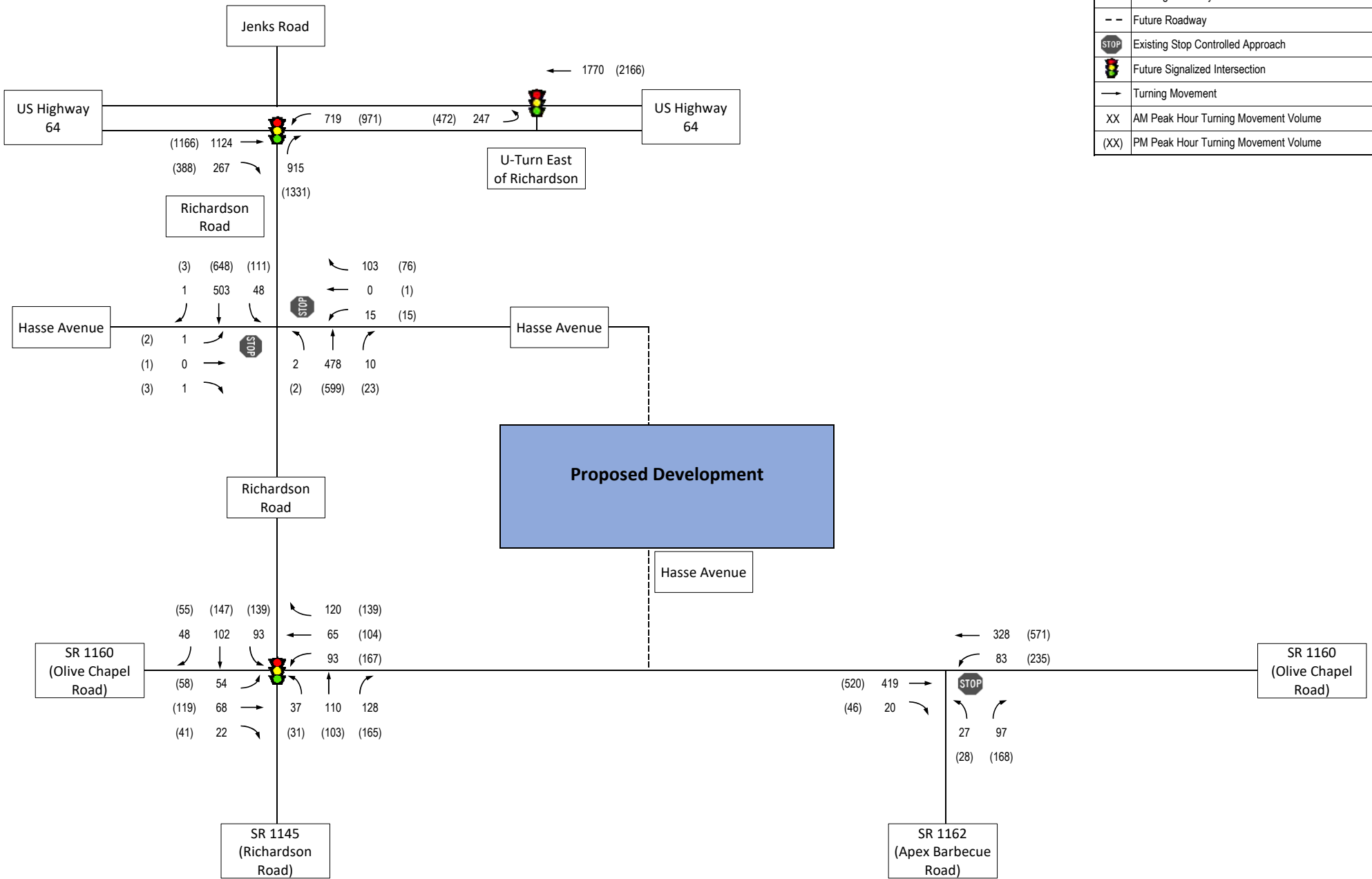
| Intersection and Approach                        | Control | No-Build (2024)     |                     |
|--|---------|---------------------|---------------------|
|  |         | AM                  | PM                  |
| <b>Richardson Rd and Olive Chapel Rd</b>         | Signal  | <b>A<br/>(9.7)</b>  | <b>B<br/>(11.8)</b> |
| Eastbound  |         | A-9.7               | B-10.7              |
| Westbound  |         | B-10.3              | B-12.0              |
| Northbound                                       |         | B-10.2              | B-12.7              |
| Southbound                                       |         | A-8.4               | B-11.5              |
| <b>Apex Barbecue Rd and Olive Chapel Rd</b>      | TWSC    | -                   | -                   |
| Northbound                                       |         | C-16.8              | F-92.5              |
| <b>Richardson Rd and Little Gem Ln/Hasse Ave</b> | TWSC    | -                   | -                   |
| Eastbound  |         | C-16.5              | C-21.8              |
| Westbound  |         | C-15.1              | C-19.1              |
| <b>Richardson Rd/WB Left-Over and US 64</b>      | Signal  | <b>C<br/>(20.7)</b> | <b>D<br/>(42.0)</b> |
| Eastbound  |         | C-20.7              | D-51.3              |
| Northbound                                       |         | C-28.2              | D-47.4              |
| Southbound                                       |         | B-10.9              | B-19.6              |
| <b>U-Turn East of Richardson Rd and US 64</b>    | Signal  | <b>B<br/>(11.8)</b> | <b>C<br/>(27.6)</b> |
| Westbound  |         | A-9.6               | C-20.5              |
| Northbound                                       |         | C-27.8              | E-59.9              |

LEGEND: X (XX) = Overall intersection LOS (intersection delay in sec/veh);

X - XX = approach LOS - approach delay in sec/veh

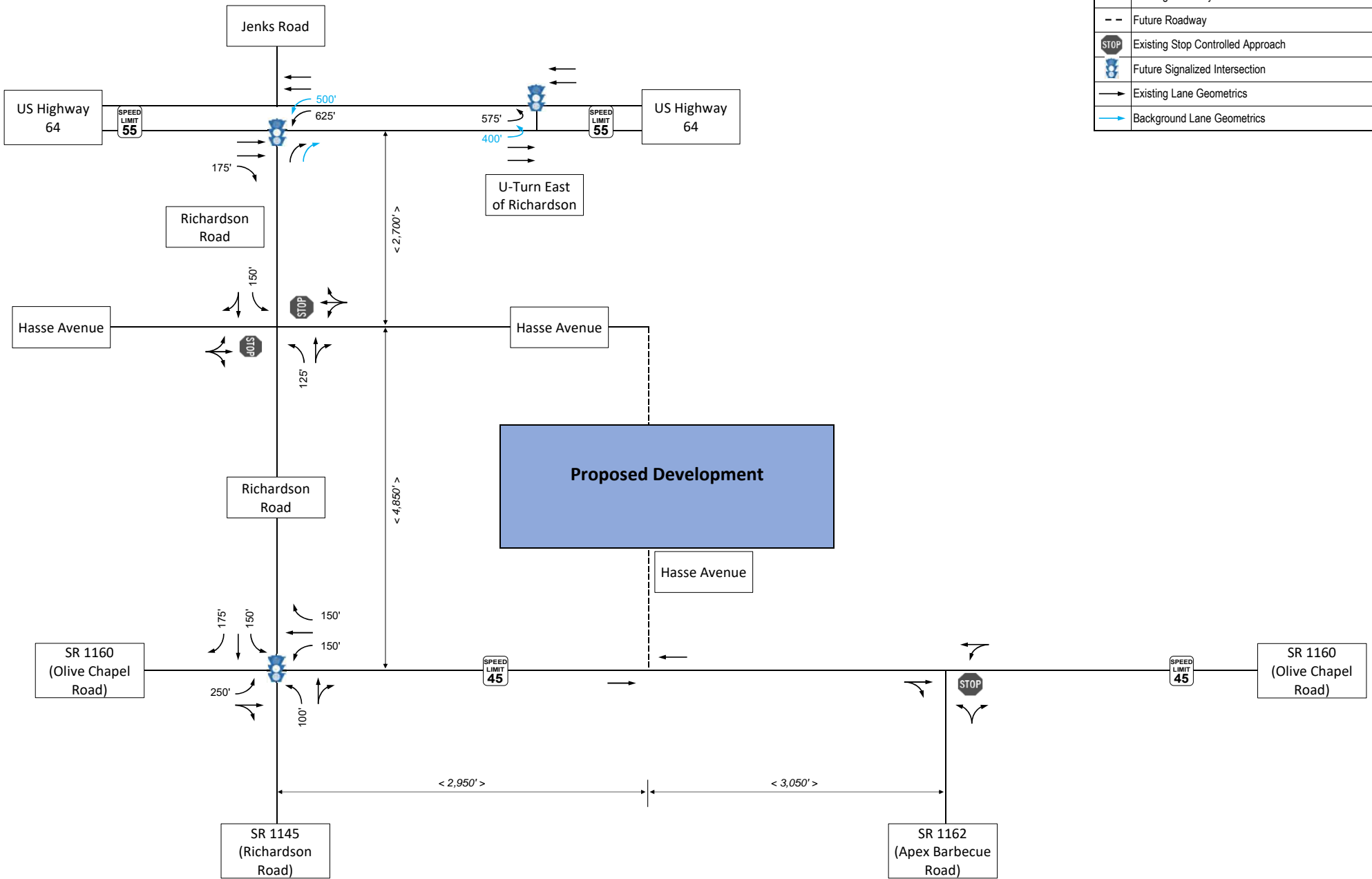


| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure 5**  
**No-Build (2024) AM and PM Peak Hour Turning Movement Volumes**

| LEGEND                  |                                   |
|-------------------------|-----------------------------------|
| —                       | Existing Roadway                  |
| - -                     | Future Roadway                    |
| STOP                    | Existing Stop Controlled Approach |
| Signalized Intersection | Future Signalized Intersection    |
| →                       | Existing Lane Geometrics          |
| →                       | Background Lane Geometrics        |



**Figure 6**  
Background (2024) Lane Geometrics and Traffic Control



## Build (2024) Conditions

There are plans to construct the proposed Hackney Tract Subdivision on the north side of Olive Chapel Road, east of the newly completed Richardson Road, in Apex, NC (Figure 1). The proposed Hackney Tract Subdivision is planned to consist of up to 100 single-family and 133 multi-family townhomes with full build-out expected in 2024.

---

### Trip Generation

Trip generation was conducted based on the most appropriate corresponding trip generation codes included in the *ITE Trip Generation Manual, 10th Edition* and the suggested method of calculation in the NCDOT's "Rate vs. Equation" Spreadsheet. To provide a conservative analysis, no transit, walking, or bicycling reductions will be applied.

Table 5 summarizes the estimated trip generation for the proposed Hackney Tract Subdivision for weekday AM and PM peak hours.

**Table 5: Trip Generation Rates**

| Land Use Code            | Land Use                        | Unit   | ADT          | AM Peak Hour |            |            | PM Peak Hour |           |            |
|--------------------------|---------------------------------|--------|--------------|--------------|------------|------------|--------------|-----------|------------|
|                          |                                 |        |              | Enter        | Exit       | Total      | Enter        | Exit      | Total      |
| 210                      | Single-Family Detached Housing  | 100 du | 1,040        | 19           | 57         | 76         | 64           | 38        | 102        |
| 220                      | Multi-Family Housing (Low-Rise) | 133 du | 965          | 14           | 49         | 63         | 48           | 28        | 76         |
| <i>Development Total</i> |                                 |        | <i>2,005</i> | <i>33</i>    | <i>106</i> | <i>139</i> | <i>112</i>   | <i>66</i> | <i>178</i> |

In total, the proposed Hackney Tract Subdivision is projected to generate 2,005 daily trips with 139 trips (33 entering, 106 exiting) occurring in the AM peak hour and 178 trips (112 entering, 66 exiting) occurring the PM peak hour.

---

### Traffic Distribution and Assignment

As shown on the conceptual site plan (Figure 2), the development will be accessed through one full movement access along Olive Chapel Road:



- Access #1: full movement access on Olive Chapel Road, approximately 2,500 feet east of Richardson Road

In addition, access will be provided via Hasse Avenue extension to the north to Richardson Road, and cross-connections will be provided via local street extensions to the west to Smith Farm. Potential traffic reductions due to cross-connections are not accounted for in this TIA to be conservative.

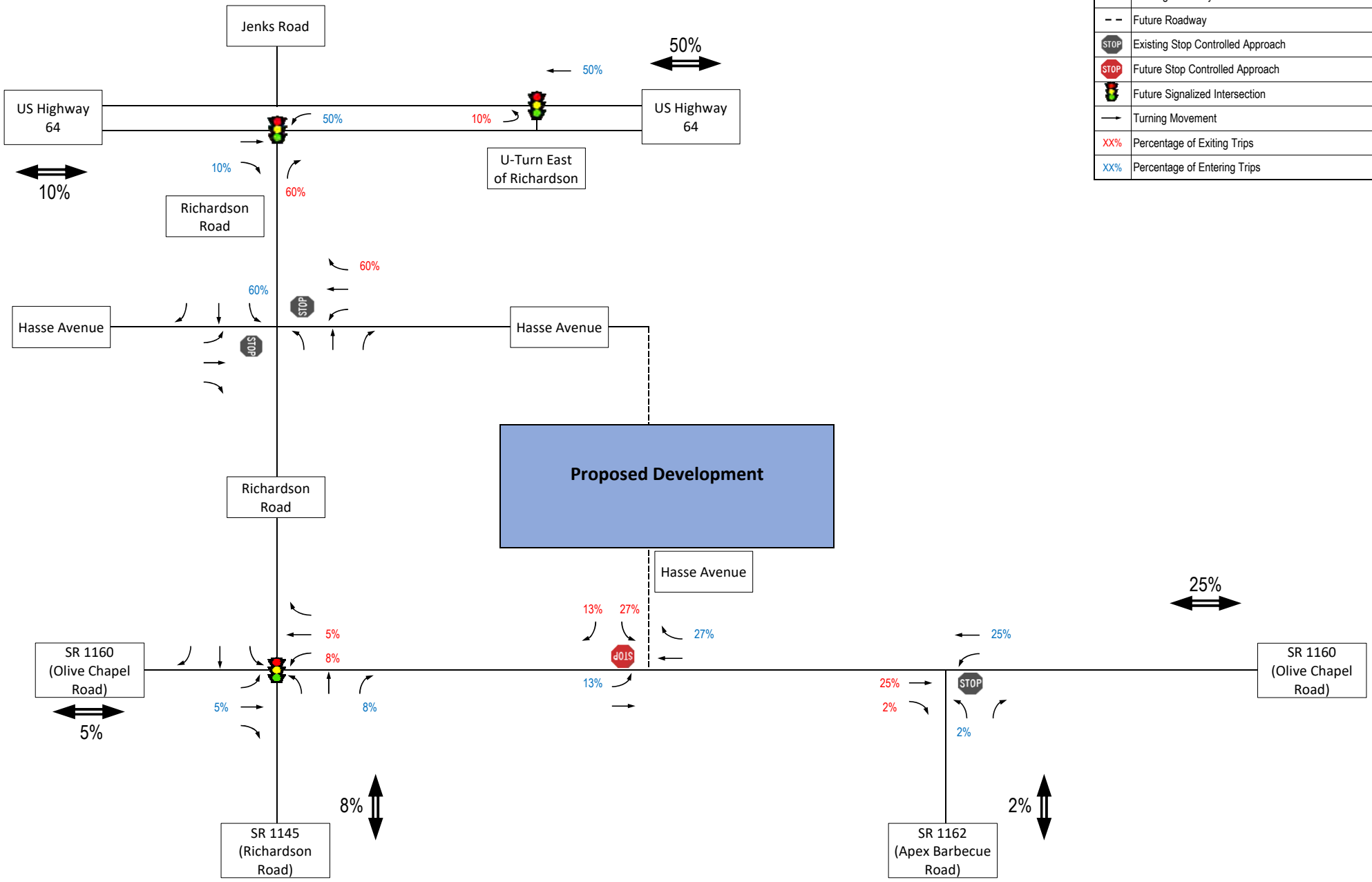
Based on agreements with the Town of Apex and NCDOT through the Memorandum of Understanding (Appendix A), the directional distribution percentages are as follows:

- from/to the east via US Highway 64 - 50%
- from/to the west via US Highway 64 - 10%
- from/to the east via Olive Chapel Road - 25%
- from/to the west via Olive Chapel Road - 5%
- from/to the south via Richardson Road - 8%
- from/to the south via Apex Barbecue Road - 2%

A graphic illustration of the proposed peak hour directional distribution percentages is shown in Figure 7, with the resulting site trips shown in Figure 8.



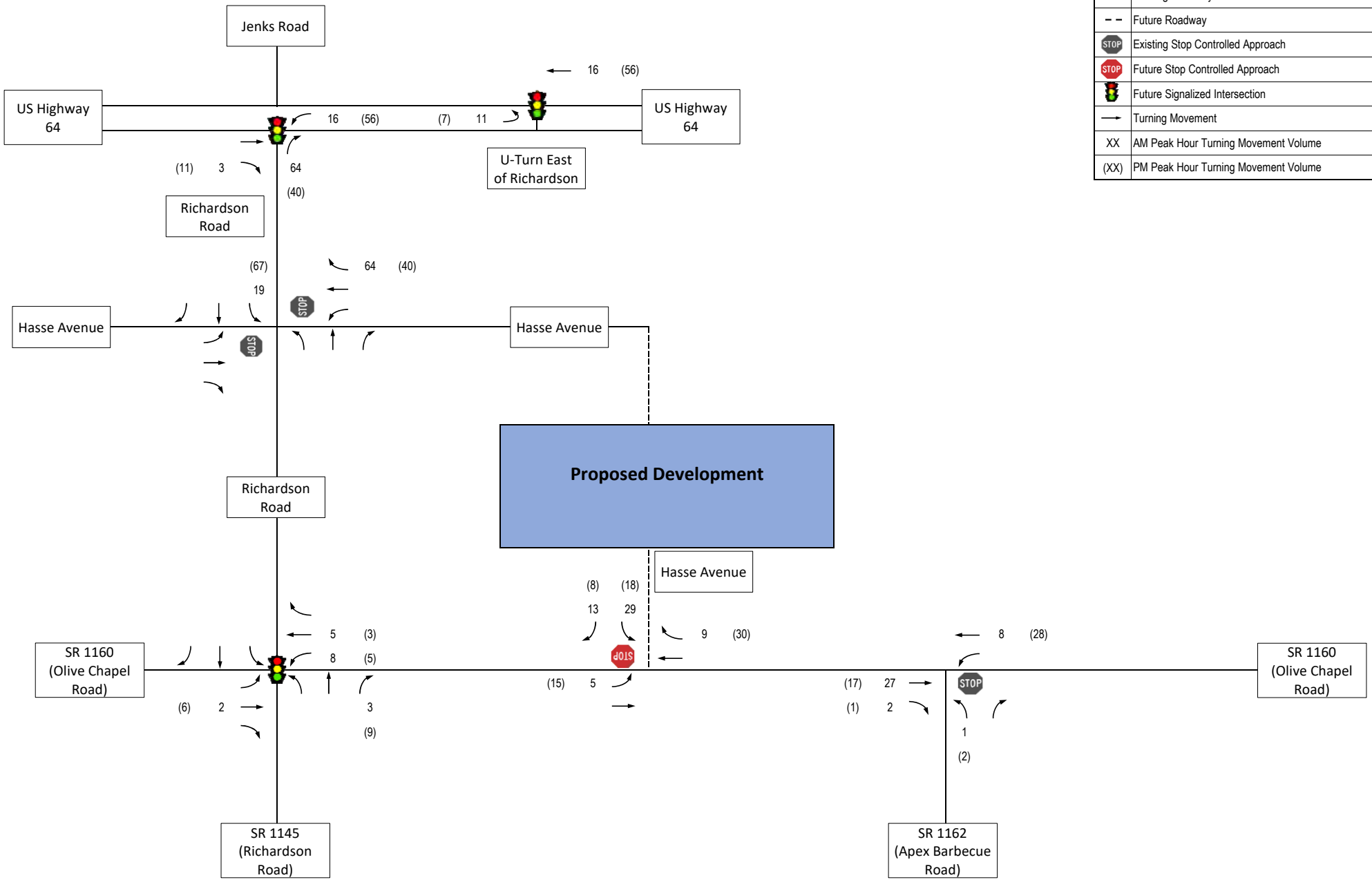
| LEGEND |                                   |
|--------|-----------------------------------|
|        | Existing Roadway                  |
|        | Future Roadway                    |
|        | Existing Stop Controlled Approach |
|        | Future Stop Controlled Approach   |
|        | Future Signalized Intersection    |
|        | Turning Movement                  |
|        | Percentage of Exiting Trips       |
|        | Percentage of Entering Trips      |



**Figure 7**  
**Peak Hour Site Trip Directional Assignment Percentages**

**Hackney Tract Subdivision**  
**Apex, NC**

| LEGEND |                                      |
|--------|--------------------------------------|
| —      | Existing Roadway                     |
| - -    | Future Roadway                       |
| STOP   | Existing Stop Controlled Approach    |
| STOP   | Future Stop Controlled Approach      |
| 🚦      | Future Signalized Intersection       |
| →      | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure 8**  
AM and PM Peak Hour Site Trips

**Hackney Tract Subdivision**  
Apex, NC



---

## Level of Service Analysis

The Build (2024) analysis scenario includes the No-Build (2024) traffic as well as site-generated trips from the proposed development. Figure 9 depicts the turning movement volumes used in the Build (2024) scenario analysis.

Intersection levels of service analyses were performed for the typical weekday AM and PM peak hours using *Synchro/SimTraffic Professional Version 10*. Table 6 summarizes the LOS results for the Build (2024) scenario and Appendix D contains the full *Synchro/HCS* reports of the analysis.

As reported in Table 6, the stop-controlled northbound approach of Apex Barbeque Road at Olive Chapel Road is projected to continue to operate at failing levels of services in the PM peak hour with delay increases. The rest of the intersections included in the study area are projected to continue operating at acceptable levels of service during both peak hours. The planned stop-controlled Future Access #1 is projected to operate at LOS C in the AM peak hour and LOS D in the PM peak hour.



**Table 6: Build (2024) LOS Results**

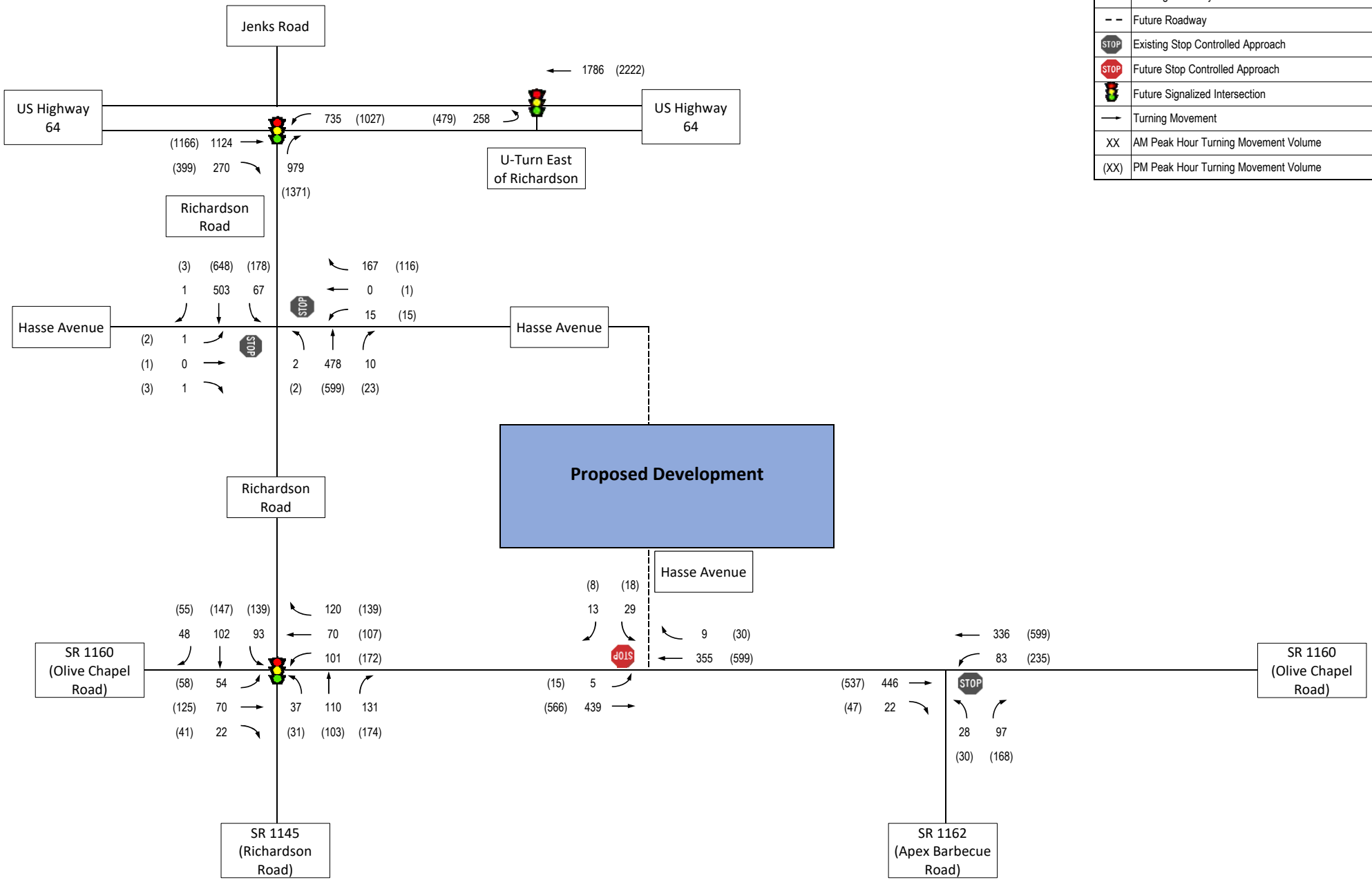
| Intersection and Approach                               | Control | Build (2024)        |                     |
|---|---------|---------------------|---------------------|
|   |         | AM                  | PM                  |
| <b>Richardson Rd and Olive Chapel Rd</b>                | Signal  | <b>A<br/>(9.8)</b>  | <b>B<br/>(12.0)</b> |
| Eastbound   |         | A-9.8               | B-10.9              |
| Westbound   |         | B-10.5              | B-12.2              |
| Northbound  |         | B-10.3              | B-13.0              |
| Southbound  |         | A-8.5               | B-11.6              |
| <b>Apex Barbecue Rd and Olive Chapel Rd</b>             | TWSC    | -                   | -                   |
| Northbound  |         | C-17.9              | F-134.5             |
| <b>Richardson Rd and Little Gem Ln/Hasse Ave</b>        | TWSC    | -                   | -                   |
| Eastbound   |         | C-19.1              | D-32.0              |
| Westbound   |         | C-17.0              | C-21.9              |
| <b>Richardson Rd/WB Left-Over and US 64</b>             | Signal  | <b>C<br/>(22.0)</b> | <b>D<br/>(44.5)</b> |
| Eastbound   |         | C-23.7              | E-56.0              |
| Northbound  |         | C-28.5              | D-50.1              |
| Southbound  |         | A-9.8               | B-19.5              |
| <b>U-Turn East of Richardson Rd and US 64</b>           | Signal  | <b>B<br/>(12.5)</b> | <b>C<br/>(30.9)</b> |
| Westbound   |         | B-10.5              | C-24.1              |
| Northbound  |         | C-26.5              | E-62.1              |
| <b>Olive Chapel Rd &amp; Hasse Ave/Future Access #1</b> | TWSC    | -                   | -                   |
| Southbound  |         | C-16.1              | D-25.0              |

LEGEND: X (XX) = Overall intersection LOS (intersection delay in sec/veh);

X - XX = approach LOS - approach delay in sec/veh



| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Stop Controlled Approach      |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure 9**  
Build (2024) AM and PM Peak Hour Turning Movement Volumes

Hackney Tract Subdivision  
Apex, NC

## Findings and Conclusions

As indicated in the traffic operations analyses, the proposed Hackney Tract Subdivision is projected to have minimum impacts on traffic operations of the surrounding roadway network and intersections. Nevertheless, the following roadway improvements are recommended to improve traffic operations and safety:

SR 1160 (Olive Chapel Road) and Future Access #1/Hasse Avenue Extension (unsignalized, full movement)

Future Access #1 is projected to operate at acceptable levels of service during the AM and PM peak hour with a two-lane cross-section. Although traffic volumes are not projected to automatically warrant turn lanes on Olive Chapel Road, dedicated turn lanes should be provided with the required frontage widening to meet the Town of Apex Comprehensive Transportation Plan standards. Therefore, the following site access configuration and transportation improvements are recommended at this intersection:

- Construct Future Access #1 to consist of one inbound lane and one outbound lane.
- Provide a dedicated left-turn lane on eastbound Olive Chapel Road with 100 feet of storage length and appropriate taper.
- Provide a dedicated right-turn lane on westbound Olive Chapel Road with 100 feet of storage length and appropriate taper.

SR 1160 (Olive Chapel Road) and SR 1162 (Apex Barbecue Road) (unsignalized)

Traffic analysis indicated that the northbound approach of Apex Barbecue Road is projected to operate at LOS F in the PM peak hour under the No-Build and Build conditions. The intersection is not anticipated to meet warrants for installing a new traffic signal, while options for adding new turn lanes are limited due to the skewed angle of intersection on a curve of Olive Chapel Road and potential right-of-way/drainage restrictions. As shown on the Apex Comprehensive Transportation Plan, this intersection is identified for future intersection realignment. Since site trips are anticipated to contribute less than 4% traffic increases in the AM and 3% in the PM at this intersection (increases of only 1 VPH in the AM peak hour and 2 VPH in the PM peak on the stop-controlled approach), improvement should not be required by this development based on the Town of Apex UDO. Nevertheless, alternative traffic control method (such as AWSC), if warranted by crash analysis, may be considered



before this intersection is realigned in the future based on the Town of Apex CTP.

The rest of study area intersections are expected to operate acceptably. Therefore, no mitigation is required. A summary of the findings for the analysis scenarios is shown in Table 7, and the resulting future lane configurations and traffic controls in 2024 are shown in Figure 10.



Table 7: Summary LOS Table

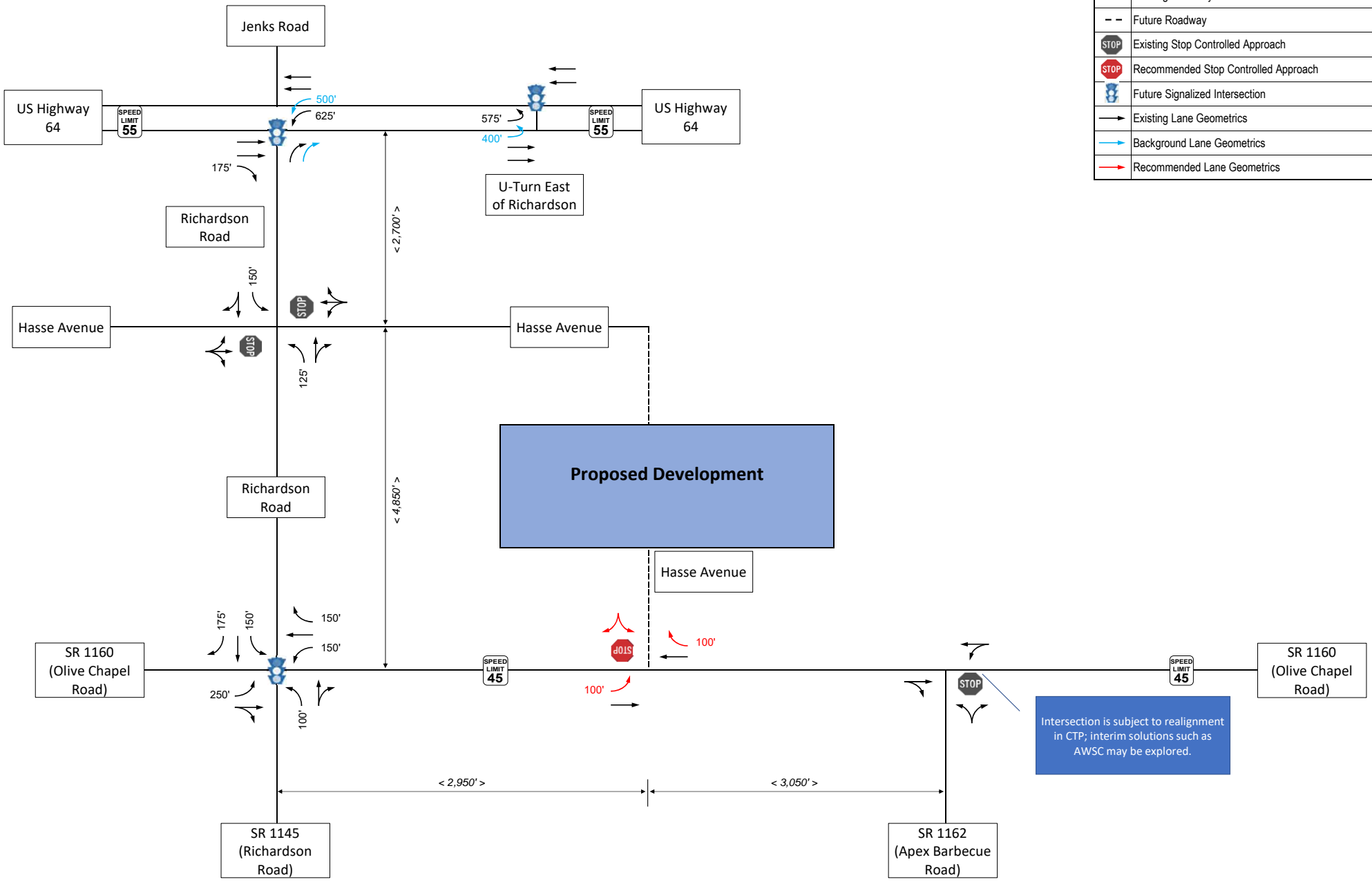
| Intersection and Approach                               | Control         | Existing (2020) |         | No-Build (2024)     |                     | Build (2024)        |                     |
|---|-----------------|-----------------|---------|---------------------|---------------------|---------------------|---------------------|
|   |                 | AM              | PM      | AM                  | PM                  | AM                  | PM                  |
| <b>Richardson Rd and Olive Chapel Rd</b>                | TWSC/<br>Signal | -               | -       | <b>A<br/>(9.7)</b>  | <b>B<br/>(11.8)</b> | <b>A<br/>(9.8)</b>  | <b>B<br/>(12.0)</b> |
| Eastbound   |                 | ---             | ---     | A-9.7               | B-10.7              | A-9.8               | B-10.9              |
| Westbound   |                 | ---             | ---     | B-10.3              | B-12.0              | B-10.5              | B-12.2              |
| Northbound  |                 | B-11.9          | B-14.1  | B-10.2              | B-12.7              | B-10.3              | B-13.0              |
| Southbound  |                 | B-11.7          | C-15.5  | A-8.4               | B-11.5              | A-8.5               | B-11.6              |
| <b>Apex Barbecue Rd and Olive Chapel Rd</b>             | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Northbound  |                 | B-11.8          | C-19.5  | C-16.8              | F-92.5              | C-17.9              | F-134.5             |
| <b>Richardson Rd and Little Gem Ln/Hasse Ave</b>        | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Eastbound   |                 | A-9.8           | B-10.2  | C-16.5              | C-21.8              | C-19.1              | D-32.0              |
| Westbound   |                 | A-9.7           | A-9.9   | C-15.1              | C-19.1              | C-17.0              | C-21.9              |
| <b>Richardson Rd/WB Left-Over and US 64</b>             | TWSC/<br>Signal | -               | -       | <b>C<br/>(20.7)</b> | <b>D<br/>(42.0)</b> | <b>C<br/>(22.0)</b> | <b>D<br/>(44.5)</b> |
| Eastbound   |                 | ---             | ---     | C-20.7              | D-51.3              | C-23.7              | E-56.0              |
| Northbound  |                 | C-23.5          | C-23.3  | C-28.2              | D-47.4              | C-28.5              | D-50.1              |
| Southbound  |                 | F-66.0          | F-216.7 | B-10.9              | B-19.6              | A-9.8               | B-19.5              |
| <b>U-Turn East of Richardson Rd and US 64</b>           | TWSC/<br>Signal | -               | -       | <b>B<br/>(11.8)</b> | <b>C<br/>(27.6)</b> | <b>B<br/>(12.5)</b> | <b>C<br/>(30.9)</b> |
| Westbound   |                 | ---             | ---     | A-9.6               | C-20.5              | B-10.5              | C-24.1              |
| Northbound  |                 | B-14.2          | C-18.2  | C-27.8              | E-59.9              | C-26.5              | E-62.1              |
| <b>Olive Chapel Rd &amp; Hasse Ave/Future Access #1</b> | TWSC            | -               | -       | -                   | -                   | -                   | -                   |
| Southbound  |                 | ---             | ---     | ---                 | ---                 | C-16.1              | D-25.0              |

LEGEND: X (XX) = Overall intersection LOS (intersection delay in sec/veh);

X - XX = approach LOS - approach delay in sec/veh



| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Recommended Stop Controlled Approach |
|        | Future Signalized Intersection       |
|        | Existing Lane Geometrics             |
|        | Background Lane Geometrics           |
|        | Recommended Lane Geometrics          |



**Figure 10**  
**Future (2024) Lane Geometrics and Traffic Control**

**Hackney Tract Subdivision**  
**Apex, NC**



# APPENDICES



## **APPENDIX A:**

# **Memorandum of Understanding**



## Memorandum

To: Russell H. Dalton, PE  
Public Works & Transportation  
Town of Apex  
73 Hunter Street  
Apex, NC 27502

Date: November 12, 2020

Project #: 38504.25

From: Baohong Wan, PhD, PE  
Senior Project Manager

Re: Hackney Tract Subdivision TIA  
Memorandum of Understanding

---

This memorandum summarizes the assumptions for a Traffic Impact Analysis (TIA) prepared for the proposed Hackney Tract Subdivision on Olive Chapel Road, west of the newly completed Richardson Road, in Apex, NC. Based on the preliminary plan (attached), the development is to consist of a mix of single-family and multi-family townhome uses:

- 100 single family homes
- 133 townhomes

Access to the development is to be provided primarily through a collector street (Hasse Avenue Extension) planned across the property. In addition, cross-connections will be provided via several street extensions to Smith Farm.

### Study Area

Based on our previous correspondence, the following existing and future study area intersections will be included for analysis under the AM and PM peak hour conditions:

- SR 1160 (Olive Chapel Road) and SR 1145 (Richardson Road) (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and SR 1162 (Apex Barbecue Road) (unsignalized)
- Richardson Road and Hasse Avenue (unsignalized)
- US Highway 64 East at Richardson Road (unsignalized/future signalized)
- US Highway 64 West at U-turn east of Richardson Road (unsignalized/future signalized)
- SR 1160 (Olive Chapel Road) and Future Access #1/Hasse Avenue Extension (full movement access)

The signalized intersection of SR 1160 (Olive Chapel Road) and SR 1163 (Kelly Road) was initially considered, but it was excluded from the study area due to its distance from the project site and the fact that this intersection has recently been upgraded with new turn lanes and crosswalks, and traffic is expected to decrease at this intersection due to the newly completed Richardson Road connection.

### Data Collection

As discussed with the Town of Apex and NCDOT, collecting new traffic data was preferred to reflect new traffic patterns with the recently completed Richard Road between Olive Chapel Road and US 64. Turning movement data at the study intersections were collected by VHB during the AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods in November 2020. Traffic counts were collected while area schools were partially open with the



From: Baohong Wan, PhD, PE  
Senior Project Manager  
Ref: 38504.25  
November 12, 2020  
Page 2



## Memorandum

COVID-19 restrictions. The Existing (2020) AM and PM peak hour turning movement volumes are shown in the Figure MOU-1.

### Analysis Scenarios

In accordance with the Town of Apex's Unified Development Ordinance (UDO), a build-out year of 2024 will be analyzed. Therefore, weekday AM and PM peak hour analysis for the proposed development will be performed for four (4) scenarios:

- Existing (2020) Conditions
- Background (2024) Conditions
- Build (2024) Scenario
- Build (2024) Scenario with Improvements

### Background Projects and Growth

As concurred by the Town of Apex, an annual growth rate of three percent (3%) will be applied to the existing year (2020) traffic to project future conditions (2024). In addition, the following approved developments are identified as within the study area, and will be included the future year traffic analysis:

- Saddlebrook (Lawrence Assemblage/Richardson West), TIA by RKA, November 2014, 75% completed
- Sweetwater, TIA by RKA December 2014, 80% completed for residential portion, 0% for mixed use
- Buckhorn Preserve (Goodwin-MacNair), TIA by VHB, June 2015, 50% completed
- Stillwater (Womble), TIA by Stantec, February 2014, 85% completed
- Westford, TIA by KHA, December 2016, 80% completed
- Smith Farm, TIA by RKA, November 2015, 75% completed for residential portion, 0% for mixed-use
- Linden (Pricewood Assemblage) TIA by RKA, August 2016, 15% completed

Note that although a significant number of trips are expected due to the approved developments, a 3% annual traffic growth rate will still be used to offset lower-than-normal traffic counts collected under the Existing (2020) conditions. Transportation improvements due to approved developments (particularly Sweetwater and Smith Farm) will be included in the future year analysis based on the transportation zoning conditions.

### Trip Generation

Trip Generation will be conducted based on the most appropriate corresponding trip generation codes included in the *ITE Trip Generation Manual, 10<sup>th</sup> Edition*. Trip generation calculations will be based on the suggested method in the NCDOT's "Rate vs. Equation" spreadsheet. To provide a conservative analysis, no transit, walking, or bicycling reductions will be applied.

As shown in the preliminary trip generation results (attached), the proposed development is projected to generate 2,005 trips on a typical weekday with 139 trips occurring during the AM peak hour and 178 trips in the PM peak hour.

From: Baohong Wan, PhD, PE  
 Senior Project Manager  
 Ref: 38504.25  
 November 12, 2020  
 Page 3



Memorandum

| Land Use Code <sup>1</sup> | Land Use                        | Unit   | ADT          | AM Peak Hour |            |            | PM Peak Hour |           |            |
|----------------------------|---------------------------------|--------|--------------|--------------|------------|------------|--------------|-----------|------------|
|                            |                                 |        |              | Enter        | Exit       | Total      | Enter        | Exit      | Total      |
| 210                        | Single-Family Detached Housing  | 100 du | 1,040        | 19           | 57         | 76         | 64           | 38        | 102        |
| 220                        | Multi-Family Housing (Low-Rise) | 133 du | 965          | 14           | 49         | 63         | 48           | 28        | 76         |
| <i>Development Total</i>   |                                 |        | <i>2,005</i> | <i>33</i>    | <i>106</i> | <i>139</i> | <i>112</i>   | <i>66</i> | <i>178</i> |

Notes:

1. Land Use Code and trip generation rates are based on *ITE Trip Generation, 10th Edition*
2. Trips are determined based on the suggested method in the NCDOT Rate Vs Equation Spreadsheet.

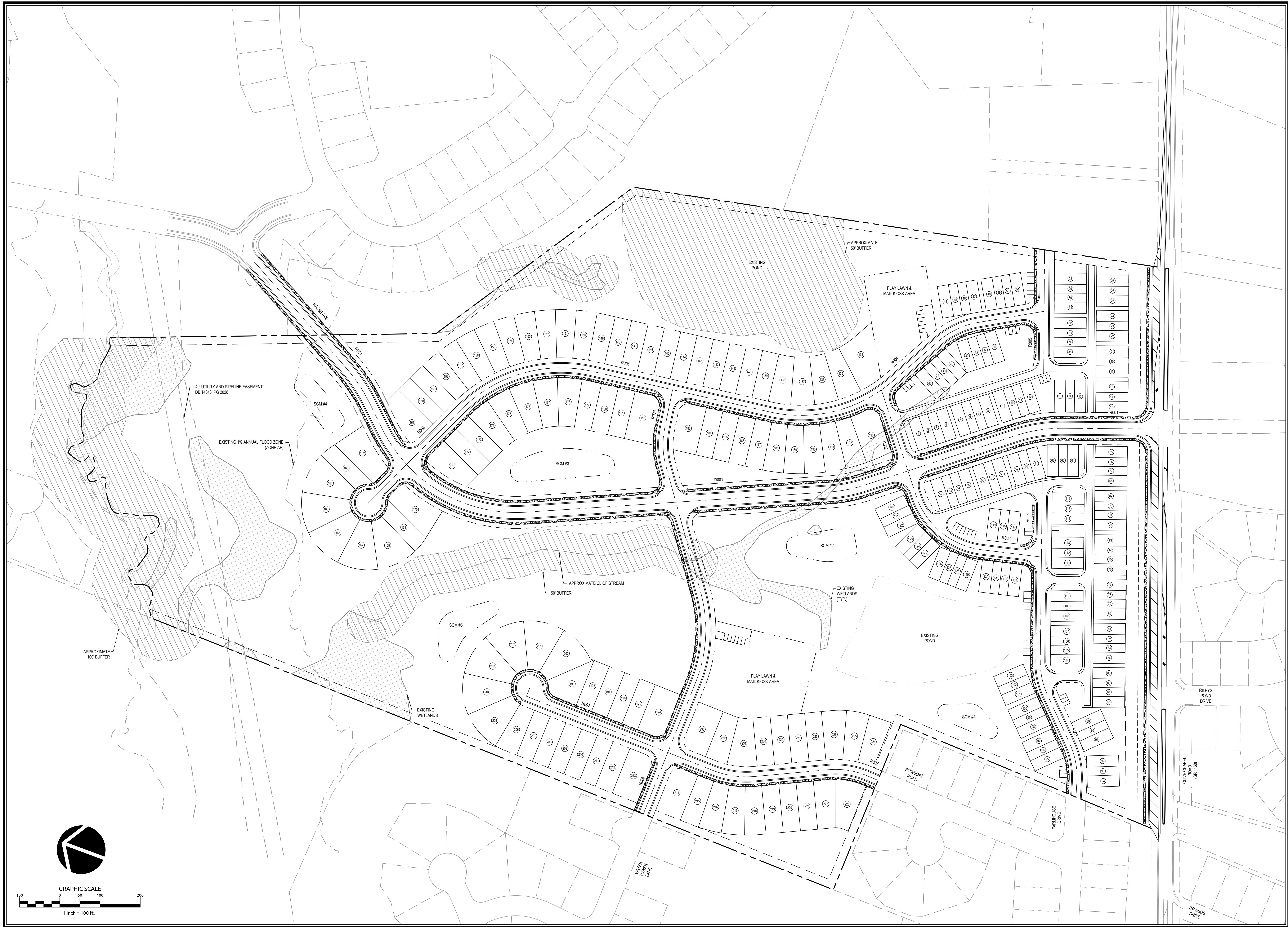
**Trip Distribution and Assignment**

The site trips will be distributed in accordance with the existing traffic patterns and planned land uses in the vicinity of the study area. Based on the traffic data, the site trips will be distributed as follows:

- from/to the east via US Highway 64 – 50%
- from/to the west via US Highway 64 – 10%
- from/to the east via Olive Chapel Road – 25%
- from/to the west via Olive Chapel Road – 5%
- from/to the south via Richardson Road – 8%
- from/to the south via Apex Barbecue Road – 2%

A graphic illustration of the proposed peak hour directional distribution percentages is shown in the attached Figure MOU-2, and the resulting AM and PM peak hour trips at each study intersection are shown in Figure MOU-3.

CC: Amy N. Neidringhaus, PE, NCDOT Highway Division 5 District 1



40' UTILITY AND PIPELINE EASEMENT  
DB 14343, PG 2028

EXISTING 1% ANNUAL FLOOD ZONE  
(ZONE AE)

APPROXIMATE CL OF STREAM  
50' BUFFER

APPROXIMATE  
50' BUFFER

APPROXIMATE  
100' BUFFER

EXISTING WETLANDS

EXISTING WETLANDS  
(TYP.)

EXISTING POND

PLAY LAWN &  
MAIL KIOSK AREA

EXISTING POND

RILEY'S POND DRIVE

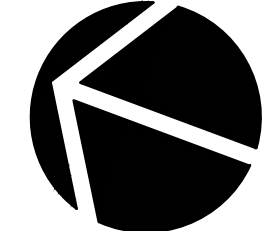
DAVE CHWEL ROAD  
(SR 1180)

THASOS DRIVE

WATER  
METER LANE

ROWBOAT ROAD

FRAMHOUSE DRIVE



GRAPHIC SCALE



1 inch = 100 ft.

**HACKNEY TRACT  
SUBDIVISION**  
APEX, NORTH CAROLINA

**OVERALL SUBDIVISION  
PLAN**

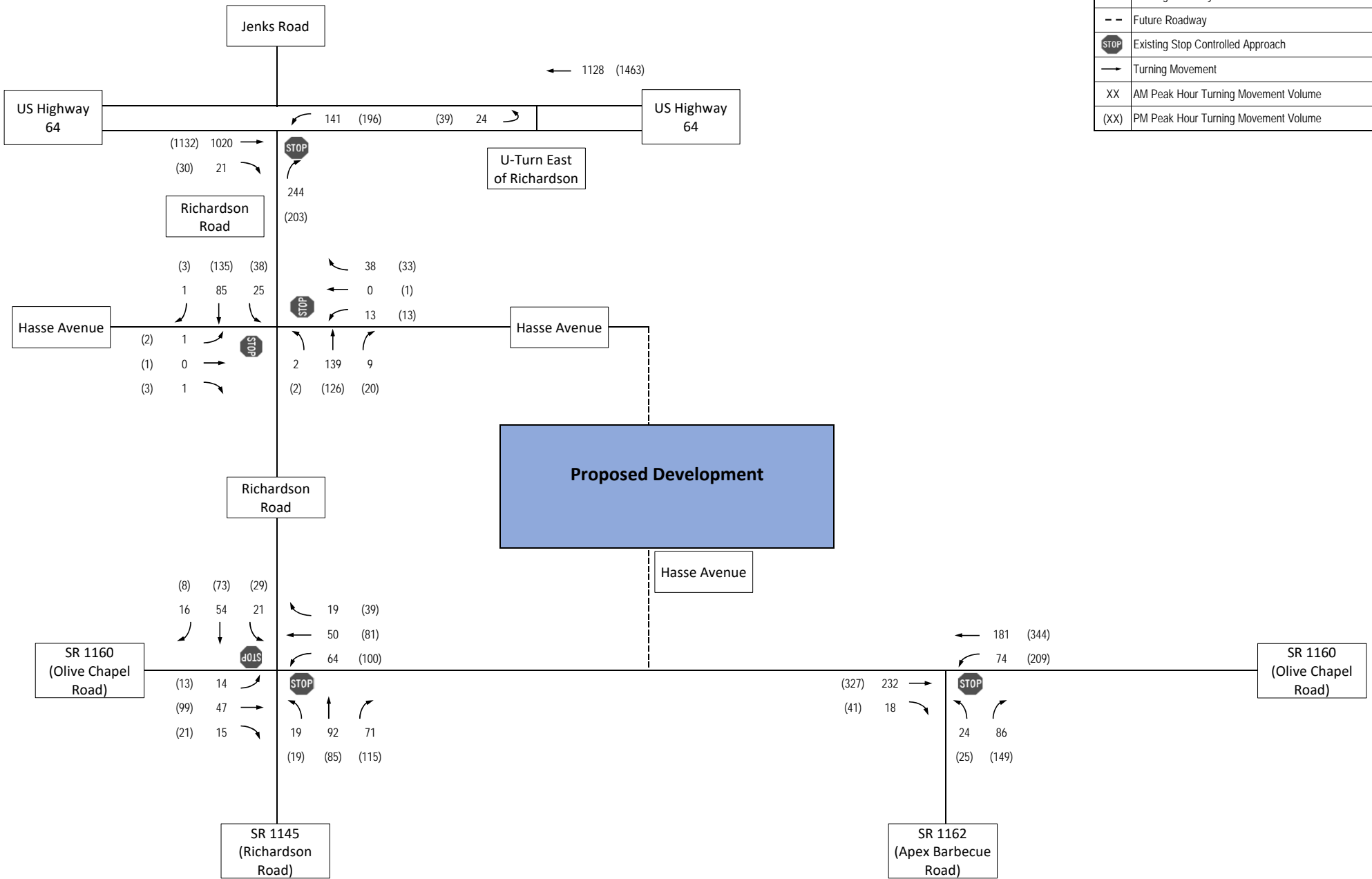
Job No. 02180517\_20 Drawn By WR  
Date 10/19/20 Designer WR

**PRELIMINARY  
NOT APPROVED FOR  
CONSTRUCTION**

| Revisions |
|-----------|
|           |
|           |
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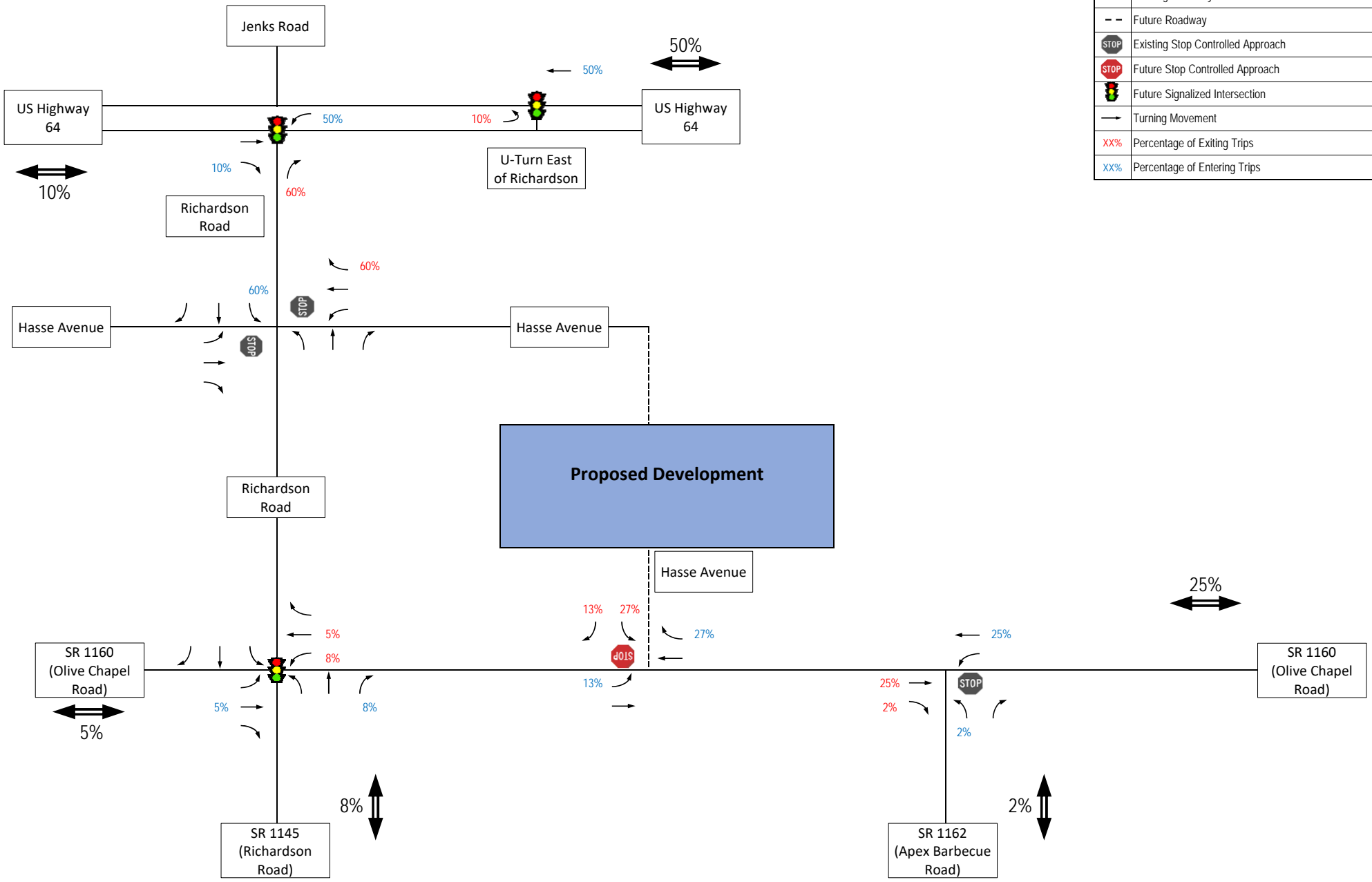
Sheet No.  
**1.0**

| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure MOU-1**  
**Existing (2020) AM and PM Peak Hour Turning Movement Volumes**

| LEGEND |                                   |
|--------|-----------------------------------|
|        | Existing Roadway                  |
|        | Future Roadway                    |
|        | Existing Stop Controlled Approach |
|        | Future Stop Controlled Approach   |
|        | Future Signalized Intersection    |
|        | Turning Movement                  |
|        | Percentage of Exiting Trips       |
|        | Percentage of Entering Trips      |

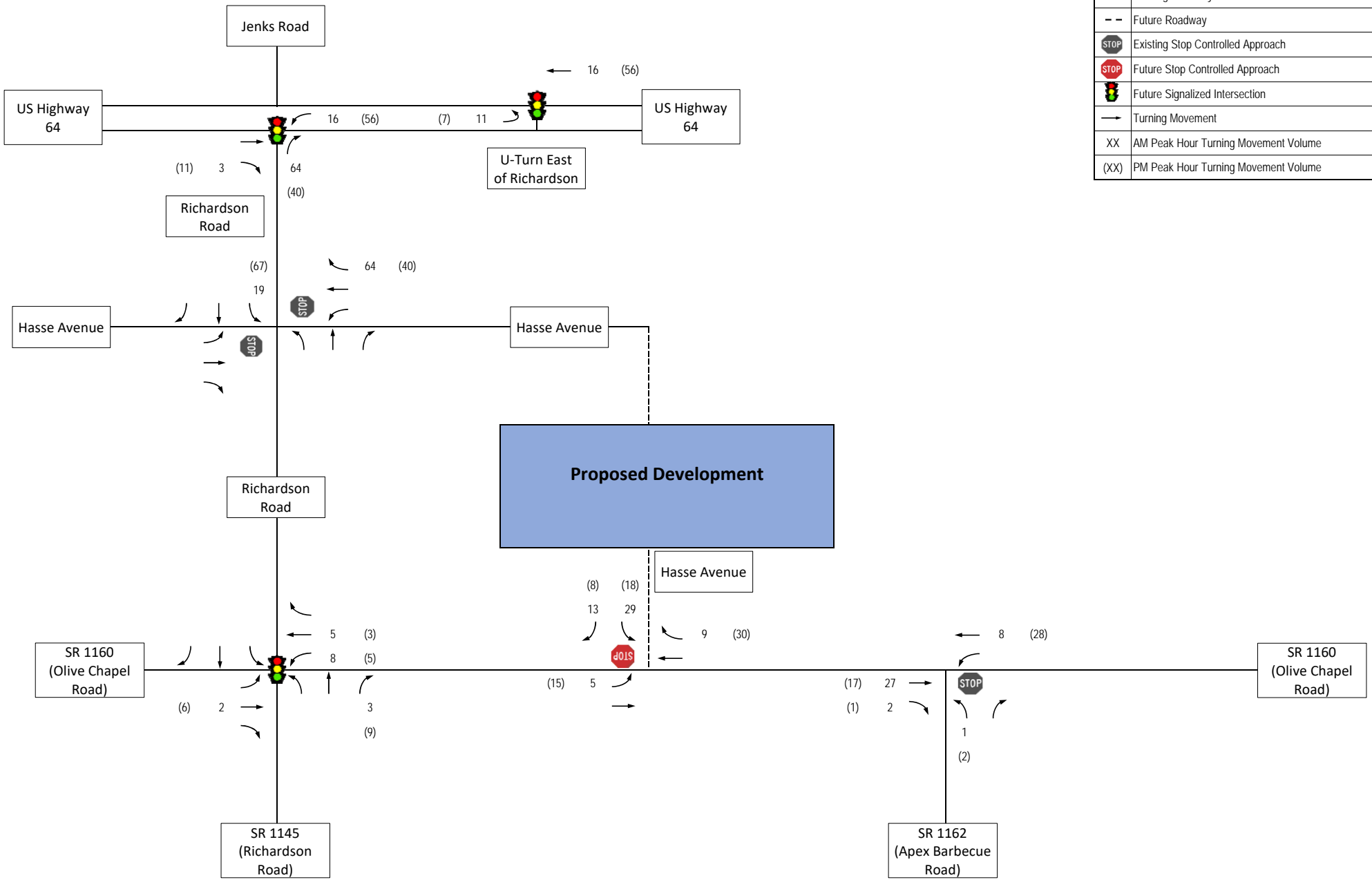


**Figure MOU-2**  
**Peak Hour Site Trip Directional Assignment Percentages**

**Hackney Tract Subdivision**  
**Apex, NC**



| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Stop Controlled Approach      |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure MOU-3**  
**AM and PM Peak Hour Site Trips**

**Hackney Tract Subdivision**  
**Apex, NC**



## **APPENDIX B:**

# **Turning Movement Counts**

# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : OliveChapel@ApexBarbecue

Site Code :

Start Date : 11/5/2020

Page No : 1

## Groups Printed- Passenger Vehicles - Single Unit - TTST - Bicycles on Crosswalk - Pedestrians

| Start Time              | Driveway Southbound |      |       |      | Olive Chapel Road Westbound |      |       |      | Apex Barbecue Road Northbound |      |       |      | Olive Chapel Road Eastbound |      |       |      | Exclu. Total | Inclu. Total | Int. Total |
|-------------------------|---------------------|------|-------|------|-----------------------------|------|-------|------|-------------------------------|------|-------|------|-----------------------------|------|-------|------|--------------|--------------|------------|
|                         | Left                | Thru | Right | Peds | Left                        | Thru | Right | Peds | Left                          | Thru | Right | Peds | Left                        | Thru | Right | Peds |              |              |            |
| 07:00 AM                | 0                   | 0    | 0     | 0    | 9                           | 18   | 0     | 0    | 2                             | 0    | 21    | 1    | 0                           | 35   | 3     | 0    | 1            | 88           | 89         |
| 07:15 AM                | 0                   | 0    | 0     | 0    | 9                           | 20   | 0     | 0    | 4                             | 0    | 19    | 1    | 0                           | 44   | 5     | 0    | 1            | 101          | 102        |
| 07:30 AM                | 0                   | 0    | 0     | 0    | 13                          | 24   | 0     | 0    | 4                             | 0    | 29    | 3    | 0                           | 46   | 5     | 0    | 3            | 121          | 124        |
| 07:45 AM                | 0                   | 0    | 0     | 0    | 21                          | 45   | 0     | 0    | 6                             | 0    | 30    | 4    | 0                           | 57   | 10    | 0    | 4            | 169          | 173        |
| Total                   | 0                   | 0    | 0     | 0    | 52                          | 107  | 0     | 0    | 16                            | 0    | 99    | 9    | 0                           | 182  | 23    | 0    | 9            | 479          | 488        |
| 08:00 AM                | 0                   | 0    | 0     | 0    | 13                          | 43   | 0     | 0    | 7                             | 0    | 19    | 5    | 0                           | 52   | 2     | 0    | 5            | 136          | 141        |
| 08:15 AM                | 0                   | 0    | 0     | 0    | 14                          | 51   | 0     | 0    | 7                             | 0    | 23    | 0    | 0                           | 58   | 5     | 0    | 0            | 158          | 158        |
| 08:30 AM                | 0                   | 0    | 0     | 0    | 16                          | 36   | 0     | 0    | 6                             | 0    | 27    | 2    | 0                           | 54   | 4     | 0    | 2            | 143          | 145        |
| 08:45 AM                | 0                   | 0    | 0     | 0    | 31                          | 51   | 0     | 0    | 4                             | 0    | 17    | 0    | 0                           | 68   | 7     | 0    | 0            | 178          | 178        |
| Total                   | 0                   | 0    | 0     | 0    | 74                          | 181  | 0     | 0    | 24                            | 0    | 86    | 7    | 0                           | 232  | 18    | 0    | 7            | 615          | 622        |
| *** BREAK ***           |                     |      |       |      |                             |      |       |      |                               |      |       |      |                             |      |       |      |              |              |            |
| 04:00 PM                | 0                   | 1    | 0     | 0    | 47                          | 72   | 0     | 0    | 6                             | 0    | 27    | 1    | 0                           | 64   | 8     | 0    | 1            | 225          | 226        |
| 04:15 PM                | 0                   | 0    | 0     | 0    | 39                          | 87   | 1     | 0    | 12                            | 0    | 30    | 0    | 0                           | 52   | 10    | 0    | 0            | 231          | 231        |
| 04:30 PM                | 0                   | 0    | 0     | 0    | 43                          | 72   | 0     | 0    | 4                             | 0    | 32    | 6    | 0                           | 74   | 6     | 0    | 6            | 231          | 237        |
| 04:45 PM                | 0                   | 0    | 0     | 0    | 32                          | 76   | 0     | 0    | 7                             | 0    | 30    | 5    | 0                           | 70   | 9     | 0    | 5            | 224          | 229        |
| Total                   | 0                   | 1    | 0     | 0    | 161                         | 307  | 1     | 0    | 29                            | 0    | 119   | 12   | 0                           | 260  | 33    | 0    | 12           | 911          | 923        |
| 05:00 PM                | 0                   | 0    | 1     | 0    | 49                          | 94   | 0     | 0    | 8                             | 0    | 32    | 4    | 0                           | 83   | 8     | 0    | 4            | 275          | 279        |
| 05:15 PM                | 0                   | 0    | 0     | 0    | 59                          | 81   | 0     | 0    | 9                             | 0    | 42    | 8    | 0                           | 91   | 8     | 0    | 8            | 290          | 298        |
| 05:30 PM                | 0                   | 0    | 0     | 0    | 50                          | 85   | 0     | 0    | 6                             | 0    | 32    | 9    | 0                           | 83   | 8     | 0    | 9            | 264          | 273        |
| 05:45 PM                | 0                   | 0    | 0     | 0    | 51                          | 84   | 0     | 0    | 2                             | 0    | 43    | 4    | 0                           | 70   | 17    | 0    | 4            | 267          | 271        |
| Total                   | 0                   | 0    | 1     | 0    | 209                         | 344  | 0     | 0    | 25                            | 0    | 149   | 25   | 0                           | 327  | 41    | 0    | 25           | 1096         | 1121       |
| Grand Total             | 0                   | 1    | 1     | 0    | 496                         | 939  | 1     | 0    | 94                            | 0    | 453   | 53   | 0                           | 1001 | 115   | 0    | 53           | 3101         | 3154       |
| Apprch %                | 0                   | 50   | 50    |      | 34.5                        | 65.4 | 0.1   |      | 17.2                          | 0    | 82.8  |      | 0                           | 89.7 | 10.3  |      |              |              |            |
| Total %                 | 0                   | 0    | 0     |      | 16                          | 30.3 | 0     |      | 3                             | 0    | 14.6  |      | 0                           | 32.3 | 3.7   |      | 1.7          | 98.3         |            |
| Passenger Vehicles      | 0                   | 1    | 1     |      | 476                         | 916  | 1     |      | 93                            | 0    | 446   |      | 0                           | 981  | 115   |      | 0            | 0            | 3030       |
| % Passenger Vehicles    | 0                   | 100  | 100   | 0    | 96                          | 97.6 | 100   | 0    | 98.9                          | 0    | 98.5  | 0    | 0                           | 98   | 100   | 0    | 0            | 0            | 96.1       |
| Single Unit             | 0                   | 0    | 0     |      | 20                          | 20   | 0     |      | 1                             | 0    | 7     |      | 0                           | 19   | 0     |      | 0            | 0            | 67         |
| % Single Unit           | 0                   | 0    | 0     | 0    | 4                           | 2.1  | 0     | 0    | 1.1                           | 0    | 1.5   | 0    | 0                           | 1.9  | 0     | 0    | 0            | 0            | 2.1        |
| TTST                    | 0                   | 0    | 0     |      | 0                           | 3    | 0     |      | 0                             | 0    | 0     |      | 0                           | 1    | 0     |      | 0            | 0            | 4          |
| % TTST                  | 0                   | 0    | 0     | 0    | 0                           | 0.3  | 0     | 0    | 0                             | 0    | 0     | 0    | 0                           | 0.1  | 0     | 0    | 0            | 0            | 0.1        |
| Bicycles on Crosswalk   | 0                   | 0    | 0     |      | 0                           | 0    | 0     |      | 0                             | 0    | 0     |      | 0                           | 0    | 0     |      | 0            | 0            | 4          |
| % Bicycles on Crosswalk | 0                   | 0    | 0     | 0    | 0                           | 0    | 0     | 0    | 0                             | 0    | 0     | 7.5  | 0                           | 0    | 0     | 0    | 0            | 0            | 0.1        |
| Pedestrians             | 0                   | 0    | 0     |      | 0                           | 0    | 0     |      | 0                             | 0    | 0     |      | 0                           | 0    | 0     |      | 0            | 0            | 49         |
| % Pedestrians           | 0                   | 0    | 0     | 0    | 0                           | 0    | 0     | 0    | 0                             | 0    | 0     | 92.5 | 0                           | 0    | 0     | 0    | 0            | 0            | 1.6        |

# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

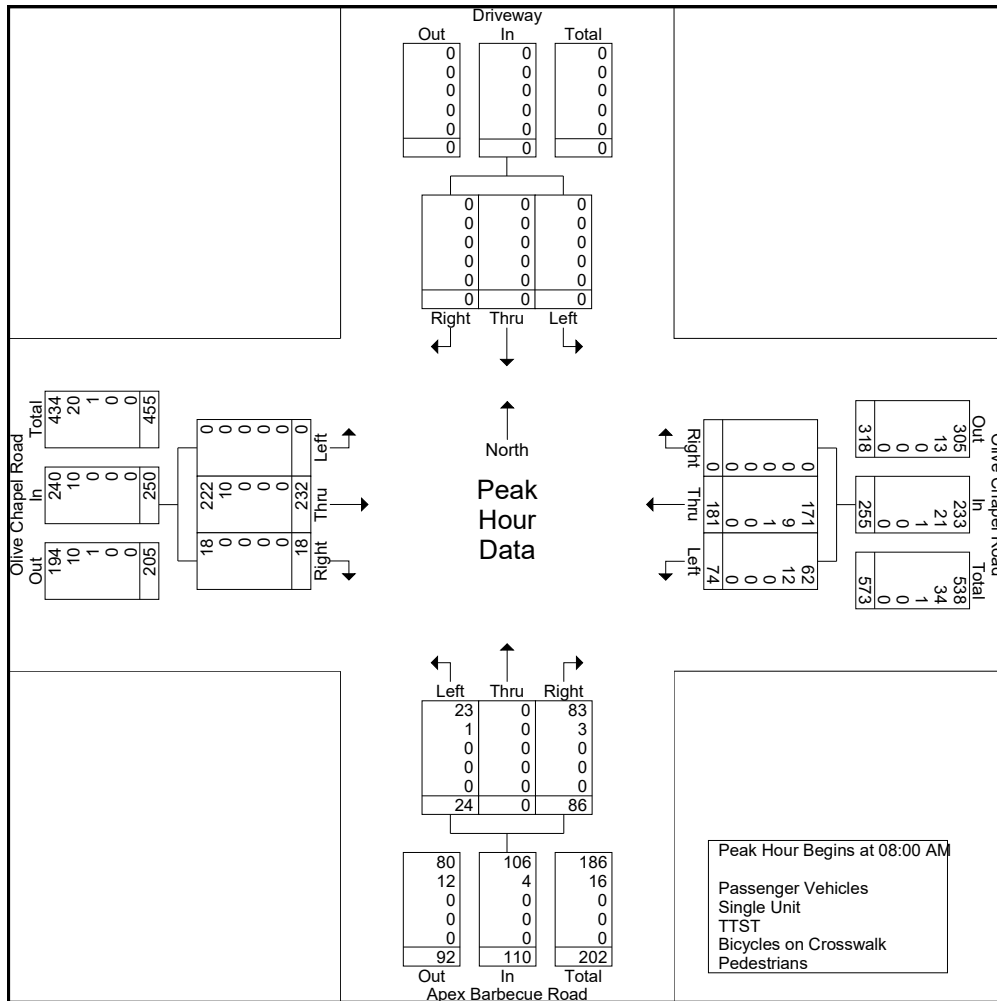
File Name : OliveChapel@ApexBarbecue

Site Code :

Start Date : 11/5/2020

Page No : 2

| Start Time   | Driveway Southbound |      |       |            | Olive Chapel Road Westbound |      |       |            | Apex Barbecue Road Northbound |      |       |            | Olive Chapel Road Eastbound |      |       |            | Int. Total |
|--|---------------------|------|-------|------------|-----------------------------|------|-------|------------|-------------------------------|------|-------|------------|-----------------------------|------|-------|------------|------------|
|  | Left                | Thru | Right | App. Total | Left                        | Thru | Right | App. Total | Left                          | Thru | Right | App. Total | Left                        | Thru | Right | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                     |      |       |            |                             |      |       |            |                               |      |       |            |                             |      |       |            |            |
| Peak Hour for Entire Intersection Begins at 08:00 AM       |                     |      |       |            |                             |      |       |            |                               |      |       |            |                             |      |       |            |            |
| 08:00 AM   | 0                   | 0    | 0     | 0          | 13                          | 43   | 0     | 56         | 7                             | 0    | 19    | 26         | 0                           | 52   | 2     | 54         | 136        |
| 08:15 AM   | 0                   | 0    | 0     | 0          | 14                          | 51   | 0     | 65         | 7                             | 0    | 23    | 30         | 0                           | 58   | 5     | 63         | 158        |
| 08:30 AM   | 0                   | 0    | 0     | 0          | 16                          | 36   | 0     | 52         | 6                             | 0    | 27    | 33         | 0                           | 54   | 4     | 58         | 143        |
| 08:45 AM   | 0                   | 0    | 0     | 0          | 31                          | 51   | 0     | 82         | 4                             | 0    | 17    | 21         | 0                           | 68   | 7     | 75         | 178        |
| Total Volume   | 0                   | 0    | 0     | 0          | 74                          | 181  | 0     | 255        | 24                            | 0    | 86    | 110        | 0                           | 232  | 18    | 250        | 615        |
| % App. Total   | 0                   | 0    | 0     | 0          | 29                          | 71   | 0     | 77.7       | 21.8                          | 0    | 78.2  | 83.3       | 0                           | 92.8 | 7.2   | 86.4       |            |
| PHF  | .000                | .000 | .000  | .000       | .597                        | .887 | .000  | .777       | .857                          | .000 | .796  | .833       | .000                        | .853 | .643  | .833       | .864       |
| Passenger Vehicles   | 0                   | 0    | 0     | 0          | 62                          | 171  | 0     | 233        | 23                            | 0    | 83    | 106        | 0                           | 222  | 18    | 240        | 579        |
| % Passenger Vehicles                                       | 0                   | 0    | 0     | 0          | 83.8                        | 94.5 | 0     | 91.4       | 95.8                          | 0    | 96.5  | 96.4       | 0                           | 95.7 | 100   | 96.0       | 94.1       |
| Single Unit  | 0                   | 0    | 0     | 0          | 12                          | 9    | 0     | 21         | 1                             | 0    | 3     | 4          | 0                           | 10   | 0     | 10         | 35         |
| % Single Unit  | 0                   | 0    | 0     | 0          | 16.2                        | 5.0  | 0     | 8.2        | 4.2                           | 0    | 3.5   | 3.6        | 0                           | 4.3  | 0     | 4.0        | 5.7        |
| TTST   | 0                   | 0    | 0     | 0          | 0                           | 1    | 0     | 1          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 1          |
| % TTST   | 0                   | 0    | 0     | 0          | 0                           | 0.6  | 0     | 0.4        | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0.2        |
| Bicycles on Crosswalk                                      | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| Pedestrians  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % Pedestrians  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |



# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

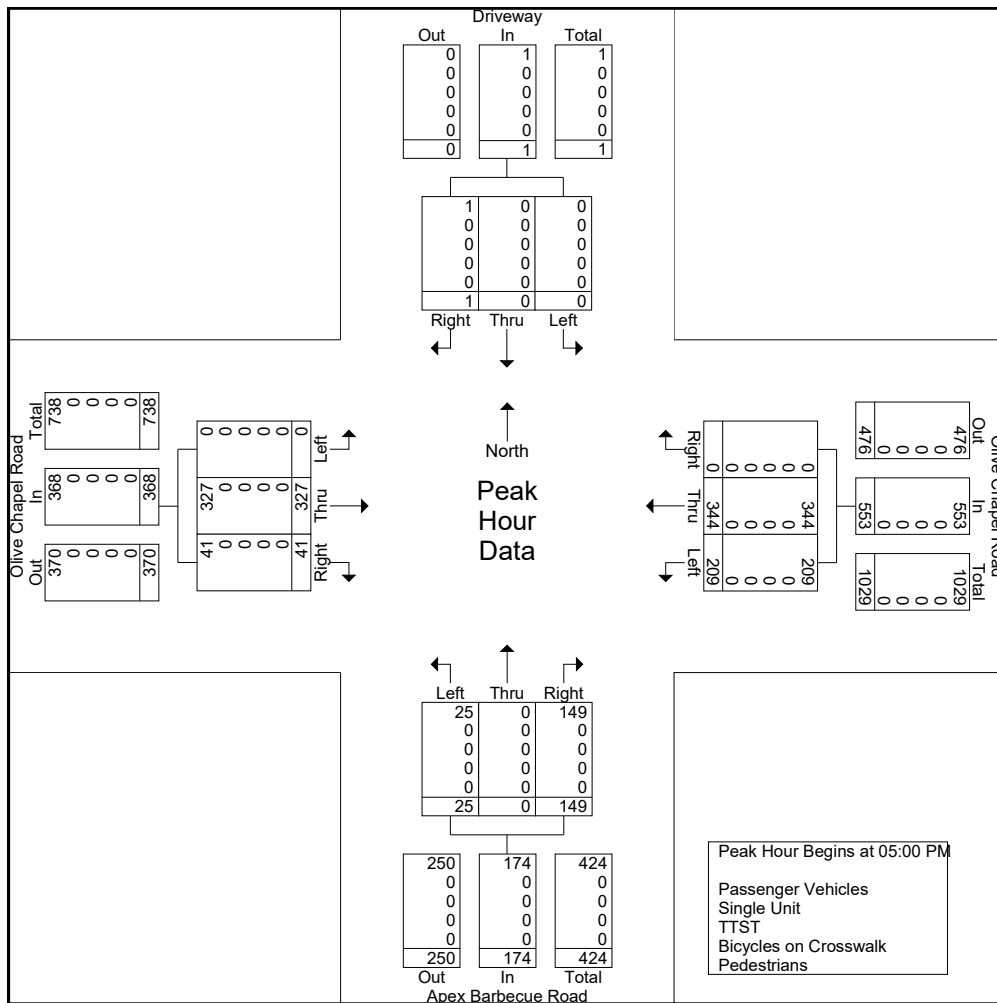
File Name : OliveChapel@ApexBarbecue

Site Code :

Start Date : 11/5/2020

Page No : 3

| Start Time   | Driveway Southbound |      |       |            | Olive Chapel Road Westbound |      |       |            | Apex Barbecue Road Northbound |      |       |            | Olive Chapel Road Eastbound |      |       |            | Int. Total |
|--|---------------------|------|-------|------------|-----------------------------|------|-------|------------|-------------------------------|------|-------|------------|-----------------------------|------|-------|------------|------------|
|  | Left                | Thru | Right | App. Total | Left                        | Thru | Right | App. Total | Left                          | Thru | Right | App. Total | Left                        | Thru | Right | App. Total |            |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                     |      |       |            |                             |      |       |            |                               |      |       |            |                             |      |       |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                     |      |       |            |                             |      |       |            |                               |      |       |            |                             |      |       |            |            |
| 05:00 PM   | 0                   | 0    | 1     | 1          | 49                          | 94   | 0     | 143        | 8                             | 0    | 32    | 40         | 0                           | 83   | 8     | 91         | 275        |
| 05:15 PM   | 0                   | 0    | 0     | 0          | 59                          | 81   | 0     | 140        | 9                             | 0    | 42    | 51         | 0                           | 91   | 8     | 99         | 290        |
| 05:30 PM   | 0                   | 0    | 0     | 0          | 50                          | 85   | 0     | 135        | 6                             | 0    | 32    | 38         | 0                           | 83   | 8     | 91         | 264        |
| 05:45 PM   | 0                   | 0    | 0     | 0          | 51                          | 84   | 0     | 135        | 2                             | 0    | 43    | 45         | 0                           | 70   | 17    | 87         | 267        |
| <b>Total Volume</b>  | 0                   | 0    | 1     | 1          | 209                         | 344  | 0     | 553        | 25                            | 0    | 149   | 174        | 0                           | 327  | 41    | 368        | 1096       |
| <b>% App. Total</b>  | 0                   | 0    | 100   |            | 37.8                        | 62.2 | 0     |            | 14.4                          | 0    | 85.6  |            | 0                           | 88.9 | 11.1  |            |            |
| PHF  | .000                | .000 | .250  | .250       | .886                        | .915 | .000  | .967       | .694                          | .000 | .866  | .853       | .000                        | .898 | .603  | .929       | .945       |
| Passenger Vehicles   | 0                   | 0    | 1     | 1          | 209                         | 344  | 0     | 553        | 25                            | 0    | 149   | 174        | 0                           | 327  | 41    | 368        | 1096       |
| % Passenger Vehicles                                       | 0                   | 0    | 100   | 100        | 100                         | 100  | 0     | 100        | 100                           | 0    | 100   | 100        | 0                           | 100  | 100   | 100        | 100        |
| Single Unit  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % Single Unit  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| TTST   | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % TTST   | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| Bicycles on Crosswalk                                      | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| Pedestrians  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |
| % Pedestrians  | 0                   | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0                             | 0    | 0     | 0          | 0                           | 0    | 0     | 0          | 0          |





# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : OliveChapel@Richardson

Site Code :

Start Date : 11/5/2020

Page No : 1

## Groups Printed- Passenger Vehicles - Single Unit - TTST - Bicycles on Crosswalk - Pedestrians

| Start Time              | Richardson Road Southbound |      |       |      | Olive Chapel Road Westbound |      |       |      | Richardson Road Northbound |      |       |      | Olive Chapel Road Eastbound |      |       |      | Exclu. Total | Inclu. Total | Int. Total |
|-------------------------|----------------------------|------|-------|------|-----------------------------|------|-------|------|----------------------------|------|-------|------|-----------------------------|------|-------|------|--------------|--------------|------------|
|                         | Left                       | Thru | Right | Peds | Left                        | Thru | Right | Peds | Left                       | Thru | Right | Peds | Left                        | Thru | Right | Peds |              |              |            |
| 07:00 AM                | 3                          | 14   | 1     | 0    | 9                           | 8    | 1     | 1    | 6                          | 14   | 5     | 0    | 1                           | 8    | 4     | 0    | 0            | 75           | 75         |
| 07:15 AM                | 2                          | 8    | 7     | 0    | 4                           | 14   | 3     | 0    | 6                          | 23   | 11    | 0    | 4                           | 9    | 4     | 0    | 0            | 95           | 95         |
| 07:30 AM                | 0                          | 15   | 2     | 0    | 8                           | 9    | 7     | 1    | 6                          | 24   | 10    | 2    | 8                           | 23   | 3     | 1    | 0            | 119          | 119        |
| 07:45 AM                | 5                          | 14   | 4     | 0    | 13                          | 16   | 4     | 0    | 5                          | 15   | 11    | 0    | 0                           | 11   | 2     | 0    | 0            | 100          | 100        |
| Total                   | 10                         | 51   | 14    | 0    | 34                          | 47   | 15    | 2    | 23                         | 76   | 37    | 2    | 13                          | 51   | 13    | 1    | 0            | 389          | 389        |
| 08:00 AM                | 3                          | 11   | 3     | 0    | 14                          | 17   | 5     | 1    | 4                          | 23   | 14    | 4    | 3                           | 8    | 2     | 0    | 0            | 112          | 112        |
| 08:15 AM                | 3                          | 18   | 4     | 0    | 15                          | 9    | 5     | 1    | 4                          | 30   | 17    | 2    | 2                           | 14   | 3     | 0    | 0            | 127          | 127        |
| 08:30 AM                | 4                          | 13   | 3     | 2    | 15                          | 14   | 6     | 0    | 6                          | 16   | 18    | 0    | 5                           | 12   | 4     | 0    | 2            | 116          | 118        |
| 08:45 AM                | 11                         | 12   | 6     | 1    | 20                          | 10   | 3     | 0    | 5                          | 23   | 22    | 0    | 4                           | 13   | 6     | 0    | 1            | 135          | 136        |
| Total                   | 21                         | 54   | 16    | 3    | 64                          | 50   | 19    | 2    | 19                         | 92   | 71    | 6    | 14                          | 47   | 15    | 0    | 3            | 490          | 493        |
| *** BREAK ***           |                            |      |       |      |                             |      |       |      |                            |      |       |      |                             |      |       |      |              |              |            |
| 04:00 PM                | 6                          | 19   | 2     | 0    | 27                          | 18   | 7     | 0    | 6                          | 14   | 13    | 1    | 4                           | 26   | 1     | 0    | 0            | 144          | 144        |
| 04:15 PM                | 4                          | 13   | 7     | 0    | 22                          | 30   | 9     | 4    | 3                          | 16   | 13    | 0    | 1                           | 18   | 2     | 3    | 0            | 145          | 145        |
| 04:30 PM                | 12                         | 23   | 0     | 2    | 16                          | 20   | 8     | 2    | 7                          | 12   | 23    | 0    | 5                           | 21   | 3     | 0    | 2            | 152          | 154        |
| 04:45 PM                | 5                          | 23   | 9     | 1    | 21                          | 18   | 12    | 0    | 3                          | 15   | 18    | 0    | 1                           | 21   | 3     | 0    | 1            | 149          | 150        |
| Total                   | 27                         | 78   | 18    | 3    | 86                          | 86   | 36    | 6    | 19                         | 57   | 67    | 1    | 11                          | 86   | 9     | 3    | 3            | 590          | 593        |
| 05:00 PM                | 6                          | 23   | 2     | 1    | 28                          | 23   | 7     | 0    | 4                          | 21   | 39    | 1    | 3                           | 18   | 4     | 0    | 1            | 179          | 180        |
| 05:15 PM                | 8                          | 17   | 2     | 0    | 29                          | 30   | 9     | 1    | 4                          | 26   | 29    | 0    | 3                           | 21   | 3     | 0    | 0            | 182          | 182        |
| 05:30 PM                | 4                          | 18   | 4     | 1    | 19                          | 12   | 16    | 0    | 9                          | 23   | 26    | 0    | 2                           | 28   | 6     | 0    | 1            | 167          | 168        |
| 05:45 PM                | 11                         | 15   | 0     | 1    | 24                          | 16   | 7     | 0    | 2                          | 15   | 21    | 0    | 5                           | 32   | 8     | 0    | 1            | 156          | 157        |
| Total                   | 29                         | 73   | 8     | 3    | 100                         | 81   | 39    | 1    | 19                         | 85   | 115   | 1    | 13                          | 99   | 21    | 0    | 3            | 684          | 687        |
| Grand Total             | 87                         | 256  | 56    | 9    | 284                         | 264  | 109   | 11   | 80                         | 310  | 290   | 10   | 51                          | 283  | 58    | 4    | 9            | 2153         | 2162       |
| Apprch %                | 21.8                       | 64.2 | 14    |      | 42.5                        | 39.5 | 16.3  | 1.6  | 11.6                       | 44.9 | 42    | 1.4  | 12.9                        | 71.5 | 14.6  | 1    |              |              |            |
| Total %                 | 4                          | 11.9 | 2.6   |      | 13.2                        | 12.3 | 5.1   | 0.5  | 3.7                        | 14.4 | 13.5  | 0.5  | 2.4                         | 13.1 | 2.7   | 0.2  | 0.4          | 99.6         |            |
| Passenger Vehicles      | 86                         | 247  | 45    |      | 276                         | 257  | 107   | 0    | 79                         | 298  | 283   | 0    | 47                          | 280  | 56    | 0    | 0            | 0            | 2061       |
| % Passenger Vehicles    | 98.9                       | 96.5 | 80.4  | 0    | 97.2                        | 97.3 | 98.2  | 0    | 98.8                       | 96.1 | 97.6  | 0    | 92.2                        | 98.9 | 96.6  | 0    | 0            | 0            | 95.3       |
| Single Unit             | 1                          | 7    | 9     |      | 8                           | 6    | 2     | 0    | 0                          | 8    | 7     | 0    | 4                           | 3    | 1     | 0    | 0            | 0            | 56         |
| % Single Unit           | 1.1                        | 2.7  | 16.1  | 0    | 2.8                         | 2.3  | 1.8   | 0    | 0                          | 2.6  | 2.4   | 0    | 7.8                         | 1.1  | 1.7   | 0    | 0            | 0            | 2.6        |
| TTST                    | 0                          | 2    | 2     |      | 0                           | 1    | 0     | 0    | 1                          | 4    | 0     | 0    | 0                           | 0    | 1     | 0    | 0            | 0            | 11         |
| % TTST                  | 0                          | 0.8  | 3.6   | 0    | 0                           | 0.4  | 0     | 0    | 1.2                        | 1.3  | 0     | 0    | 0                           | 0    | 1.7   | 0    | 0            | 0            | 0.5        |
| Bicycles on Crosswalk   | 0                          | 0    | 0     |      | 0                           | 0    | 0     | 0    | 0                          | 0    | 0     | 2    | 0                           | 0    | 0     | 0    | 0            | 0            | 2          |
| % Bicycles on Crosswalk | 0                          | 0    | 0     | 0    | 0                           | 0    | 0     | 0    | 0                          | 0    | 0     | 20   | 0                           | 0    | 0     | 0    | 0            | 0            | 0.1        |
| Pedestrians             | 0                          | 0    | 0     |      | 0                           | 0    | 0     | 11   | 0                          | 0    | 0     | 8    | 0                           | 0    | 0     | 4    | 0            | 0            | 32         |
| % Pedestrians           | 0                          | 0    | 0     | 100  | 0                           | 0    | 0     | 100  | 0                          | 0    | 0     | 80   | 0                           | 0    | 0     | 100  | 0            | 0            | 1.5        |

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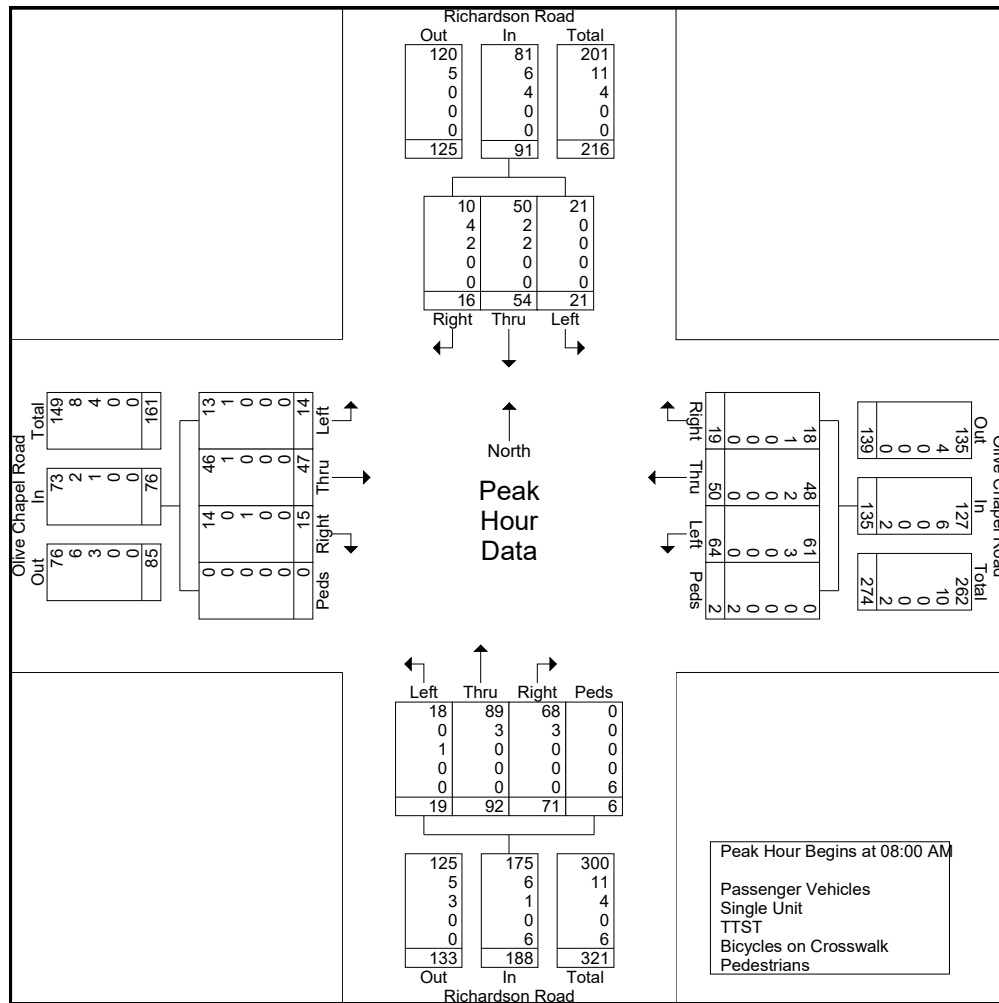
File Name : OliveChapel@Richardson

Site Code :

Start Date : 11/5/2020

Page No : 2

| Start Time   | Richardson Road Southbound |      |       |            | Olive Chapel Road Westbound |      |       |      |            | Richardson Road Northbound |      |       |      |            | Olive Chapel Road Eastbound |      |       |      |            | Int. Total |
|--|----------------------------|------|-------|------------|-----------------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|-----------------------------|------|-------|------|------------|------------|
|  | Left                       | Thru | Right | App. Total | Left                        | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Left                        | Thru | Right | Peds | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 08:00 AM       |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| 08:00 AM   | 3                          | 11   | 3     | 17         | 14                          | 17   | 5     | 1    | 37         | 4                          | 23   | 14    | 4    | 45         | 3                           | 8    | 2     | 0    | 13         | 112        |
| 08:15 AM   | 3                          | 18   | 4     | 25         | 15                          | 9    | 5     | 1    | 30         | 4                          | 30   | 17    | 2    | 53         | 2                           | 14   | 3     | 0    | 19         | 127        |
| 08:30 AM   | 4                          | 13   | 3     | 20         | 15                          | 14   | 6     | 0    | 35         | 6                          | 16   | 18    | 0    | 40         | 5                           | 12   | 4     | 0    | 21         | 116        |
| 08:45 AM   | 11                         | 12   | 6     | 29         | 20                          | 10   | 3     | 0    | 33         | 5                          | 23   | 22    | 0    | 50         | 4                           | 13   | 6     | 0    | 23         | 135        |
| Total Volume   | 21                         | 54   | 16    | 91         | 64                          | 50   | 19    | 2    | 135        | 19                         | 92   | 71    | 6    | 188        | 14                          | 47   | 15    | 0    | 76         | 490        |
| % App. Total   | 23.1                       | 59.3 | 17.6  |            | 47.4                        | 37   | 14.1  | 1.5  |            | 10.1                       | 48.9 | 37.8  | 3.2  |            | 18.4                        | 61.8 | 19.7  | 0    |            |            |
| PHF  | .477                       | .750 | .667  | .784       | .800                        | .735 | .792  | .500 | .912       | .792                       | .767 | .807  | .375 | .887       | .700                        | .839 | .625  | .000 | .826       | .907       |
| Passenger Vehicles   | 21                         | 50   | 10    | 81         | 61                          | 48   | 18    | 0    | 127        | 18                         | 89   | 68    | 0    | 175        | 13                          | 46   | 14    | 0    | 73         | 456        |
| % Passenger Vehicles                                       |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| Single Unit  | 0                          | 2    | 4     | 6          | 3                           | 2    | 1     | 0    | 6          | 0                          | 3    | 3     | 0    | 6          | 1                           | 1    | 0     | 0    | 2          | 20         |
| % Single Unit  | 0                          | 3.7  | 25.0  | 6.6        | 4.7                         | 4.0  | 5.3   | 0    | 4.4        | 0                          | 3.3  | 4.2   | 0    | 3.2        | 7.1                         | 2.1  | 0     | 0    | 2.6        | 4.1        |
| TTST   | 0                          | 2    | 2     | 4          | 0                           | 0    | 0     | 0    | 0          | 1                          | 0    | 0     | 0    | 1          | 0                           | 0    | 1     | 0    | 1          | 6          |
| % TTST   | 0                          | 3.7  | 12.5  | 4.4        | 0                           | 0    | 0     | 0    | 0          | 5.3                        | 0    | 0     | 0    | 0.5        | 0                           | 0    | 6.7   | 0    | 1.3        | 1.2        |
| Bicycles on Crosswalk                                      | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 0          |
| Pedestrians  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 2    | 2          | 0                          | 0    | 0     | 6    | 6          | 0                           | 0    | 0     | 0    | 0          | 8          |
| % Pedestrians  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 100  | 1.5        | 0                          | 0    | 0     | 100  | 3.2        | 0                           | 0    | 0     | 0    | 0          | 1.6        |



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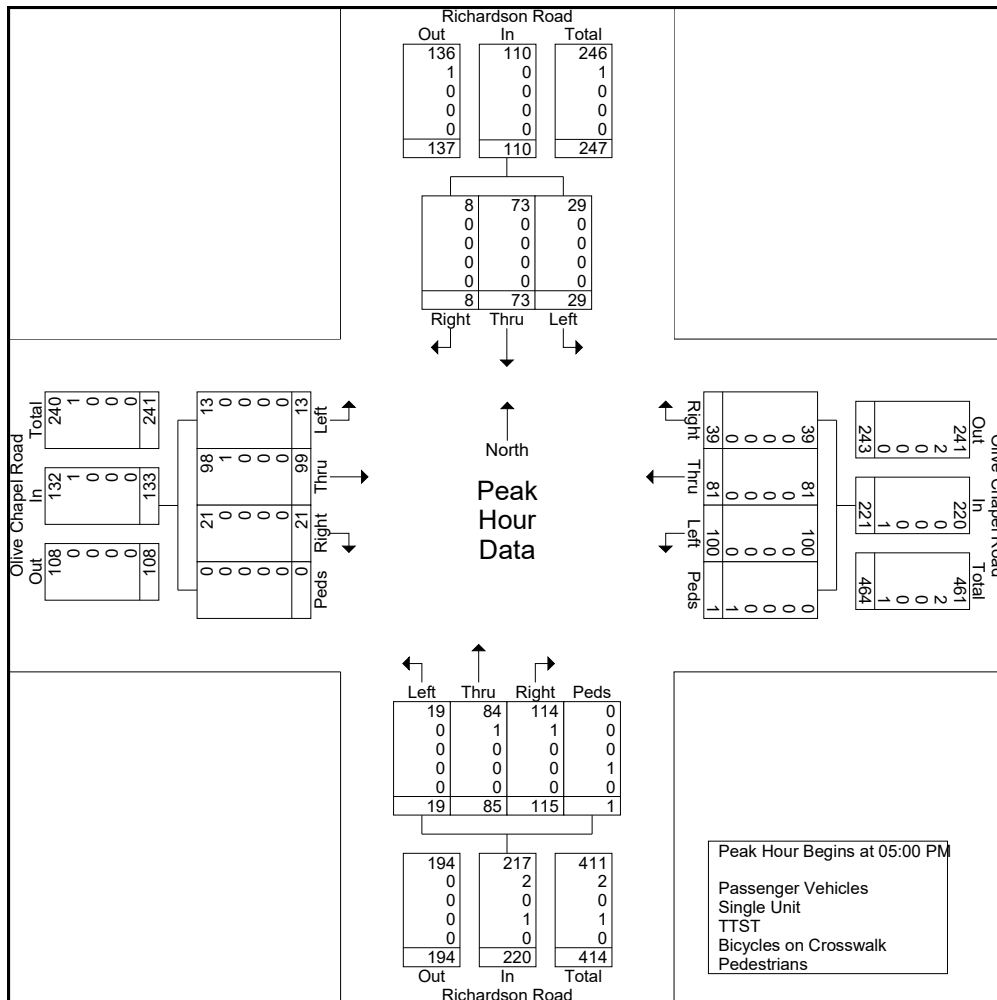
File Name : OliveChapel@Richardson

Site Code :

Start Date : 11/5/2020

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| Start Time   | Richardson Road Southbound |      |       |            | Olive Chapel Road Westbound |      |       |      |            | Richardson Road Northbound |      |       |      |            | Olive Chapel Road Eastbound |      |       |      |            | Int. Total |
|--|----------------------------|------|-------|------------|-----------------------------|------|-------|------|------------|----------------------------|------|-------|------|------------|-----------------------------|------|-------|------|------------|------------|
|  | Left                       | Thru | Right | App. Total | Left                        | Thru | Right | Peds | App. Total | Left                       | Thru | Right | Peds | App. Total | Left                        | Thru | Right | Peds | App. Total |            |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| 05:00 PM   | 6                          | 23   | 2     | 31         | 28                          | 23   | 7     | 0    | 58         | 4                          | 21   | 39    | 1    | 65         | 3                           | 18   | 4     | 0    | 25         | 179        |
| 05:15 PM   | 8                          | 17   | 2     | 27         | 29                          | 30   | 9     | 1    | 69         | 4                          | 26   | 29    | 0    | 59         | 3                           | 21   | 3     | 0    | 27         | 182        |
| 05:30 PM   | 4                          | 18   | 4     | 26         | 19                          | 12   | 16    | 0    | 47         | 9                          | 23   | 26    | 0    | 58         | 2                           | 28   | 6     | 0    | 36         | 167        |
| 05:45 PM   | 11                         | 15   | 0     | 26         | 24                          | 16   | 7     | 0    | 47         | 2                          | 15   | 21    | 0    | 38         | 5                           | 32   | 8     | 0    | 45         | 156        |
| Total Volume   | 29                         | 73   | 8     | 110        | 100                         | 81   | 39    | 1    | 221        | 19                         | 85   | 115   | 1    | 220        | 13                          | 99   | 21    | 0    | 133        | 684        |
| % App. Total   | 26.4                       | 66.4 | 7.3   |            | 45.2                        | 36.7 | 17.6  | 0.5  |            | 8.6                        | 38.6 | 52.3  | 0.5  |            | 9.8                         | 74.4 | 15.8  | 0    |            |            |
| PHF  | .659                       | .793 | .500  | .887       | .862                        | .675 | .609  | .250 | .801       | .528                       | .817 | .737  | .250 | .846       | .650                        | .773 | .656  | .000 | .739       | .940       |
| Passenger Vehicles   | 29                         | 73   | 8     | 110        | 100                         | 81   | 39    | 0    | 220        | 19                         | 84   | 114   | 0    | 217        | 13                          | 98   | 21    | 0    | 132        | 679        |
| % Passenger Vehicles                                       |                            |      |       |            |                             |      |       |      |            |                            |      |       |      |            |                             |      |       |      |            |            |
| Single Unit  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 1    | 1     | 0    | 2          | 0                           | 1    | 0     | 0    | 1          | 3          |
| % Single Unit  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 1.2  | 0.9   | 0    | 0.9        | 0                           | 1.0  | 0     | 0    | 0.8        | 0.4        |
| TTST   | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 0          |
| % TTST   | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 0          |
| Bicycles on Crosswalk                                      | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 1    | 1          | 0                           | 0    | 0     | 0    | 0          | 1          |
| % Bicycles on Crosswalk                                    | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 0    | 0          | 0                          | 0    | 0     | 100  | 0.5        | 0                           | 0    | 0     | 0    | 0          | 0.1        |
| Pedestrians  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 1    | 1          | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 1          |
| % Pedestrians  | 0                          | 0    | 0     | 0          | 0                           | 0    | 0     | 100  | 0.5        | 0                          | 0    | 0     | 0    | 0          | 0                           | 0    | 0     | 0    | 0          | 0.1        |



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Venture I

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Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : Richardson@Hasse  
 Site Code :  
 Start Date : 11/5/2020  
 Page No : 1

## Groups Printed- Passenger Vehicles - Single Unit - TTST - Bicycles on Crosswalk - Pedestrians

| Start Time              | Richardson Road Southbound |      |       |      | Hasse Avenue Westbound |      |       |      | Richardson Road Northbound |      |       |      | Little Gem Lane Eastbound |      |       |      | Exclu. Total | Inclu. Total | Int. Total |      |
|-------------------------|----------------------------|------|-------|------|------------------------|------|-------|------|----------------------------|------|-------|------|---------------------------|------|-------|------|--------------|--------------|------------|------|
|                         | Left                       | Thru | Right | Peds | Left                   | Thru | Right | Peds | Left                       | Thru | Right | Peds | Left                      | Thru | Right | Peds |              |              |            |      |
| 07:00 AM                | 3                          | 16   | 0     | 0    | 2                      | 0    | 6     | 2    | 0                          | 22   | 0     | 0    | 0                         | 0    | 0     | 0    | 0            | 2            | 49         | 51   |
| 07:15 AM                | 6                          | 16   | 0     | 2    | 1                      | 0    | 8     | 1    | 0                          | 36   | 1     | 0    | 0                         | 0    | 0     | 0    | 0            | 3            | 68         | 71   |
| 07:30 AM                | 2                          | 17   | 0     | 0    | 1                      | 0    | 14    | 0    | 2                          | 36   | 3     | 1    | 3                         | 1    | 0     | 1    | 1            | 2            | 79         | 81   |
| 07:45 AM                | 5                          | 23   | 0     | 0    | 3                      | 0    | 13    | 1    | 0                          | 26   | 2     | 0    | 1                         | 0    | 1     | 1    | 1            | 2            | 74         | 76   |
| Total                   | 16                         | 72   | 0     | 2    | 7                      | 0    | 41    | 4    | 2                          | 120  | 6     | 1    | 4                         | 1    | 1     | 2    | 2            | 9            | 270        | 279  |
| 08:00 AM                | 9                          | 17   | 0     | 0    | 2                      | 0    | 11    | 0    | 1                          | 35   | 3     | 0    | 0                         | 0    | 0     | 1    | 1            | 1            | 78         | 79   |
| 08:15 AM                | 4                          | 27   | 1     | 0    | 4                      | 0    | 9     | 1    | 0                          | 29   | 4     | 0    | 0                         | 0    | 0     | 1    | 1            | 2            | 78         | 80   |
| 08:30 AM                | 6                          | 22   | 0     | 0    | 3                      | 0    | 9     | 1    | 0                          | 36   | 1     | 0    | 1                         | 0    | 0     | 1    | 1            | 2            | 78         | 80   |
| 08:45 AM                | 6                          | 19   | 0     | 0    | 4                      | 0    | 9     | 0    | 1                          | 39   | 1     | 1    | 0                         | 0    | 1     | 1    | 1            | 2            | 80         | 82   |
| Total                   | 25                         | 85   | 1     | 0    | 13                     | 0    | 38    | 2    | 2                          | 139  | 9     | 1    | 1                         | 0    | 1     | 4    | 4            | 7            | 314        | 321  |
| *** BREAK ***           |                            |      |       |      |                        |      |       |      |                            |      |       |      |                           |      |       |      |              |              |            |      |
| 04:00 PM                | 2                          | 24   | 0     | 3    | 0                      | 1    | 8     | 1    | 0                          | 17   | 5     | 0    | 1                         | 0    | 0     | 1    | 1            | 5            | 58         | 63   |
| 04:15 PM                | 7                          | 19   | 3     | 1    | 7                      | 0    | 6     | 4    | 0                          | 28   | 2     | 1    | 1                         | 0    | 0     | 0    | 0            | 6            | 73         | 79   |
| 04:30 PM                | 5                          | 22   | 0     | 2    | 1                      | 0    | 8     | 2    | 0                          | 26   | 3     | 1    | 0                         | 0    | 0     | 2    | 2            | 7            | 65         | 72   |
| 04:45 PM                | 11                         | 36   | 0     | 2    | 3                      | 0    | 10    | 0    | 0                          | 21   | 6     | 0    | 1                         | 1    | 0     | 0    | 0            | 2            | 89         | 91   |
| Total                   | 25                         | 101  | 3     | 8    | 11                     | 1    | 32    | 7    | 0                          | 92   | 16    | 2    | 3                         | 1    | 0     | 3    | 3            | 20           | 285        | 305  |
| 05:00 PM                | 10                         | 33   | 0     | 2    | 2                      | 0    | 7     | 0    | 0                          | 33   | 6     | 0    | 1                         | 0    | 1     | 0    | 0            | 2            | 93         | 95   |
| 05:15 PM                | 8                          | 24   | 0     | 2    | 5                      | 1    | 7     | 2    | 0                          | 40   | 3     | 1    | 0                         | 0    | 2     | 1    | 1            | 6            | 90         | 96   |
| 05:30 PM                | 9                          | 42   | 3     | 0    | 3                      | 0    | 9     | 0    | 2                          | 32   | 5     | 0    | 0                         | 0    | 0     | 1    | 1            | 1            | 105        | 106  |
| 05:45 PM                | 7                          | 21   | 0     | 0    | 2                      | 0    | 3     | 0    | 2                          | 27   | 5     | 0    | 0                         | 0    | 1     | 0    | 0            | 0            | 68         | 68   |
| Total                   | 34                         | 120  | 3     | 4    | 12                     | 1    | 26    | 2    | 4                          | 132  | 19    | 1    | 1                         | 0    | 4     | 2    | 2            | 9            | 356        | 365  |
| Grand Total             | 100                        | 378  | 7     | 14   | 43                     | 2    | 137   | 15   | 8                          | 483  | 50    | 5    | 9                         | 2    | 6     | 11   | 11           | 45           | 1225       | 1270 |
| Apprch %                | 20.6                       | 77.9 | 1.4   |      | 23.6                   | 1.1  | 75.3  |      | 1.5                        | 89.3 | 9.2   |      | 52.9                      | 11.8 | 35.3  |      |              |              |            |      |
| Total %                 | 8.2                        | 30.9 | 0.6   |      | 3.5                    | 0.2  | 11.2  |      | 0.7                        | 39.4 | 4.1   |      | 0.7                       | 0.2  | 0.5   |      |              | 3.5          | 96.5       |      |
| Passenger Vehicles      | 98                         | 365  | 6     |      | 41                     | 2    | 136   |      | 8                          | 467  | 49    |      | 8                         | 0    | 6     |      |              | 0            | 0          | 1186 |
| % Passenger Vehicles    | 98                         | 96.6 | 85.7  | 0    | 95.3                   | 100  | 99.3  | 0    | 100                        | 96.7 | 98    | 0    | 88.9                      | 0    | 100   | 0    | 0            | 0            | 0          | 93.4 |
| Single Unit             | 2                          | 6    | 1     |      | 2                      | 0    | 1     |      | 0                          | 10   | 1     |      | 1                         | 1    | 0     |      |              | 0            | 0          | 25   |
| % Single Unit           | 2                          | 1.6  | 14.3  | 0    | 4.7                    | 0    | 0.7   | 0    | 0                          | 2.1  | 2     | 0    | 11.1                      | 50   | 0     | 0    | 0            | 0            | 0          | 2    |
| TTST                    | 0                          | 7    | 0     |      | 0                      | 0    | 0     |      | 0                          | 6    | 0     |      | 0                         | 1    | 0     |      |              | 0            | 0          | 14   |
| % TTST                  | 0                          | 1.9  | 0     | 0    | 0                      | 0    | 0     | 0    | 0                          | 1.2  | 0     | 0    | 0                         | 50   | 0     | 0    | 0            | 0            | 0          | 1.1  |
| Bicycles on Crosswalk   | 0                          | 0    | 0     |      | 0                      | 0    | 0     |      | 0                          | 0    | 0     |      | 0                         | 0    | 0     |      |              | 0            | 0          | 2    |
| % Bicycles on Crosswalk | 0                          | 0    | 0     | 7.1  | 0                      | 0    | 0     | 0    | 0                          | 0    | 0     | 20   | 0                         | 0    | 0     | 0    | 0            | 0            | 0          | 0.2  |
| Pedestrians             | 0                          | 0    | 0     |      | 0                      | 0    | 0     |      | 0                          | 0    | 0     |      | 0                         | 0    | 0     |      |              | 0            | 0          | 43   |
| % Pedestrians           | 0                          | 0    | 0     | 92.9 | 0                      | 0    | 0     | 100  | 0                          | 0    | 0     | 80   | 0                         | 0    | 0     | 100  | 0            | 0            | 0          | 3.4  |

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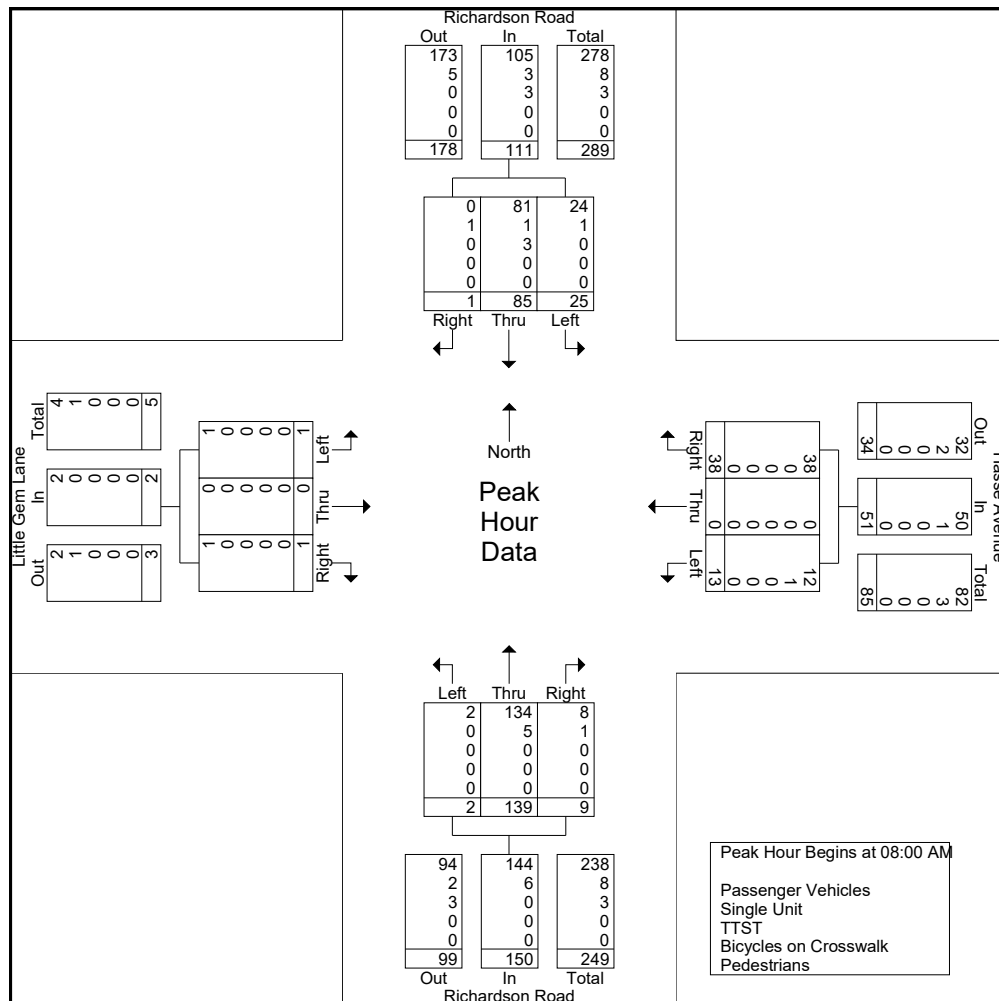
File Name : Richardson@Hasse

Site Code :

Start Date : 11/5/2020

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| Start Time   | Richardson Road Southbound |      |       |            | Hasse Avenue Westbound |      |       |            | Richardson Road Northbound |      |       |            | Little Gem Lane Eastbound |      |       |            | Int. Total |
|--|----------------------------|------|-------|------------|------------------------|------|-------|------------|----------------------------|------|-------|------------|---------------------------|------|-------|------------|------------|
|  | Left                       | Thru | Right | App. Total | Left                   | Thru | Right | App. Total | Left                       | Thru | Right | App. Total | Left                      | Thru | Right | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1 |                            |      |       |            |                        |      |       |            |                            |      |       |            |                           |      |       |            |            |
| Peak Hour for Entire Intersection Begins at 08:00 AM       |                            |      |       |            |                        |      |       |            |                            |      |       |            |                           |      |       |            |            |
| 08:00 AM   | 9                          | 17   | 0     | 26         | 2                      | 0    | 11    | 13         | 1                          | 35   | 3     | 39         | 0                         | 0    | 0     | 0          | 78         |
| 08:15 AM   | 4                          | 27   | 1     | 32         | 4                      | 0    | 9     | 13         | 0                          | 29   | 4     | 33         | 0                         | 0    | 0     | 0          | 78         |
| 08:30 AM   | 6                          | 22   | 0     | 28         | 3                      | 0    | 9     | 12         | 0                          | 36   | 1     | 37         | 1                         | 0    | 0     | 1          | 78         |
| 08:45 AM   | 6                          | 19   | 0     | 25         | 4                      | 0    | 9     | 13         | 1                          | 39   | 1     | 41         | 0                         | 0    | 1     | 1          | 80         |
| Total Volume   | 25                         | 85   | 1     | 111        | 13                     | 0    | 38    | 51         | 2                          | 139  | 9     | 150        | 1                         | 0    | 1     | 2          | 314        |
| % App. Total   | 22.5                       | 76.6 | 0.9   |            | 25.5                   | 0    | 74.5  |            | 1.3                        | 92.7 | 6     |            | 50                        | 0    | 50    |            |            |
| PHF  | .694                       | .787 | .250  | .867       | .813                   | .000 | .864  | .981       | .500                       | .891 | .563  | .915       | .250                      | .000 | .250  | .500       | .981       |
| Passenger Vehicles   | 24                         | 81   | 0     | 105        | 12                     | 0    | 38    | 50         | 2                          | 134  | 8     | 144        | 1                         | 0    | 1     | 2          | 301        |
| % Passenger Vehicles                                       | 96.0                       | 95.3 | 0     | 94.6       | 92.3                   | 0    | 100   | 98.0       | 100                        | 96.4 | 88.9  | 96.0       | 100                       | 0    | 100   | 100        | 95.9       |
| Single Unit  | 1                          | 1    | 1     | 3          | 1                      | 0    | 0     | 1          | 0                          | 5    | 1     | 6          | 0                         | 0    | 0     | 0          | 10         |
| % Single Unit  | 4.0                        | 1.2  | 100   | 2.7        | 7.7                    | 0    | 0     | 2.0        | 0                          | 3.6  | 11.1  | 4.0        | 0                         | 0    | 0     | 0          | 3.2        |
| TTST   | 0                          | 3    | 0     | 3          | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 3          |
| % TTST   | 0                          | 3.5  | 0     | 2.7        | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 1.0        |
| Bicycles on Crosswalk                                      | 0                          | 0    | 0     | 0          | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                          | 0    | 0     | 0          | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 0          |
| Pedestrians  | 0                          | 0    | 0     | 0          | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 0          |
| % Pedestrians  | 0                          | 0    | 0     | 0          | 0                      | 0    | 0     | 0          | 0                          | 0    | 0     | 0          | 0                         | 0    | 0     | 0          | 0          |





# VHB Engineering NC, P.C.

Venture I

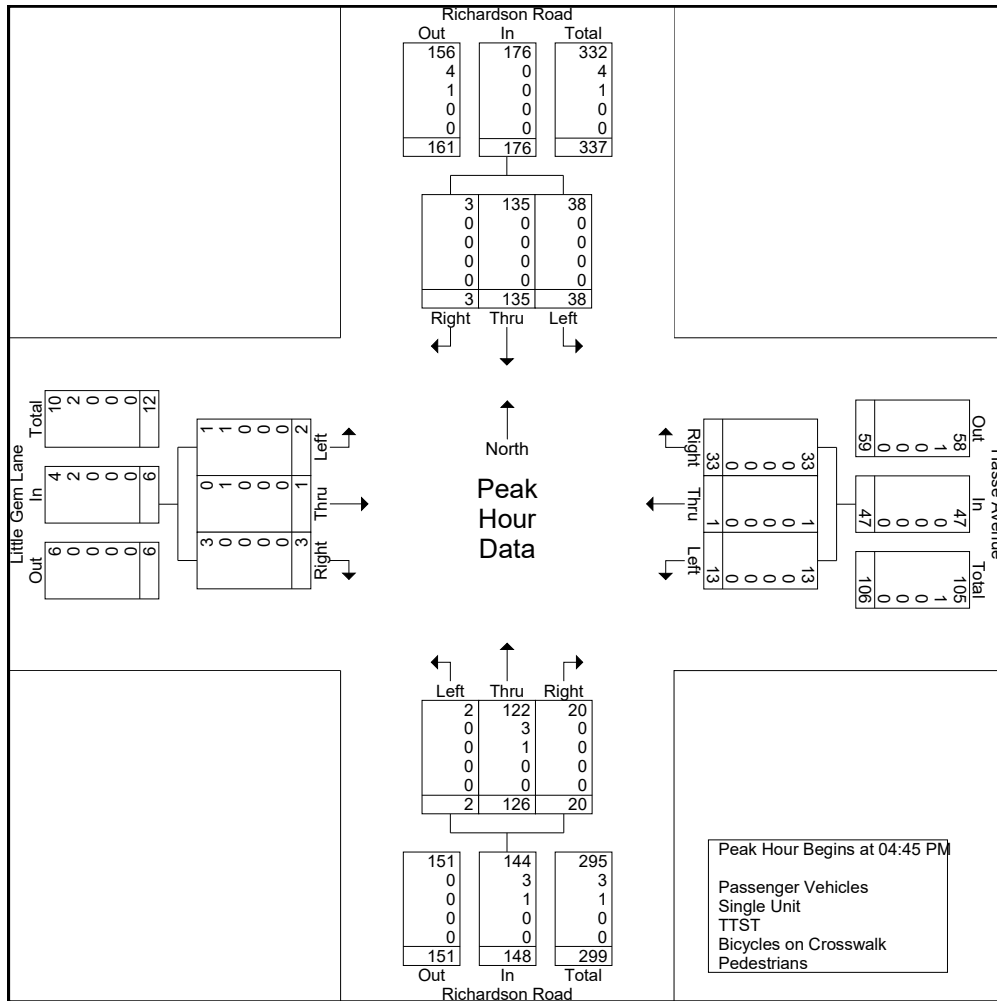
940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : Richardson@Hasse  
 Site Code :  
 Start Date : 11/5/2020  
 Page No : 3

| Start Time   | Richardson Road Southbound |             |            |            | Hasse Avenue Westbound |            |             |            | Richardson Road Northbound |             |             |            | Little Gem Lane Eastbound |             |           |            | Int. Total |
|--|----------------------------|-------------|------------|------------|------------------------|------------|-------------|------------|----------------------------|-------------|-------------|------------|---------------------------|-------------|-----------|------------|------------|
|  | Left                       | Thru        | Right      | App. Total | Left                   | Thru       | Right       | App. Total | Left                       | Thru        | Right       | App. Total | Left                      | Thru        | Right     | App. Total |            |
| Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1 |                            |             |            |            |                        |            |             |            |                            |             |             |            |                           |             |           |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                            |             |            |            |                        |            |             |            |                            |             |             |            |                           |             |           |            |            |
| 04:45 PM   | 11                         | 36          | 0          | 47         | 3                      | 0          | 10          | 13         | 0                          | 21          | 6           | 27         | 1                         | 1           | 0         | 2          | 89         |
| 05:00 PM   | 10                         | 33          | 0          | 43         | 2                      | 0          | 7           | 9          | 0                          | 33          | 6           | 39         | 1                         | 0           | 1         | 2          | 93         |
| 05:15 PM   | 8                          | 24          | 0          | 32         | 5                      | 1          | 7           | 13         | 0                          | 40          | 3           | 43         | 0                         | 0           | 2         | 2          | 90         |
| 05:30 PM   | 9                          | 42          | 3          | 54         | 3                      | 0          | 9           | 12         | 2                          | 32          | 5           | 39         | 0                         | 0           | 0         | 0          | 105        |
| <b>Total Volume</b>  | <b>38</b>                  | <b>135</b>  | <b>3</b>   | <b>176</b> | <b>13</b>              | <b>1</b>   | <b>33</b>   | <b>47</b>  | <b>2</b>                   | <b>126</b>  | <b>20</b>   | <b>148</b> | <b>2</b>                  | <b>1</b>    | <b>3</b>  | <b>6</b>   | <b>377</b> |
| <b>% App. Total</b>  | <b>21.6</b>                | <b>76.7</b> | <b>1.7</b> |            | <b>27.7</b>            | <b>2.1</b> | <b>70.2</b> |            | <b>1.4</b>                 | <b>85.1</b> | <b>13.5</b> |            | <b>33.3</b>               | <b>16.7</b> | <b>50</b> |            |            |
| PHF  | .864                       | .804        | .250       | .815       | .650                   | .250       | .825        | .904       | .250                       | .788        | .833        | .860       | .500                      | .250        | .375      | .750       | .898       |
| Passenger Vehicles   | 38                         | 135         | 3          | 176        | 13                     | 1          | 33          | 47         | 2                          | 122         | 20          | 144        | 1                         | 0           | 3         | 4          | 371        |
| % Passenger Vehicles                                       | 100                        | 100         | 100        | 100        | 100                    | 100        | 100         | 100        | 100                        | 96.8        | 100         | 97.3       | 50.0                      | 0           | 100       | 66.7       | 98.4       |
| Single Unit  | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 3           | 0           | 3          | 1                         | 1           | 0         | 2          | 5          |
| % Single Unit  | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 2.4         | 0           | 2.0        | 50.0                      | 100         | 0         | 33.3       | 1.3        |
| TTST   | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 1           | 0           | 1          | 0                         | 0           | 0         | 0          | 1          |
| % TTST   | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 0.8         | 0           | 0.7        | 0                         | 0           | 0         | 0          | 0.3        |
| Bicycles on Crosswalk                                      | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 0           | 0           | 0          | 0                         | 0           | 0         | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 0           | 0           | 0          | 0                         | 0           | 0         | 0          | 0          |
| Pedestrians  | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 0           | 0           | 0          | 0                         | 0           | 0         | 0          | 0          |
| % Pedestrians  | 0                          | 0           | 0          | 0          | 0                      | 0          | 0           | 0          | 0                          | 0           | 0           | 0          | 0                         | 0           | 0         | 0          | 0          |



# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : US64@Richardson  
 Site Code :  
 Start Date : 11/5/2020  
 Page No : 1

## Groups Printed- Passenger Vehicles - Single Unit - TTST - Bicycles on Crosswalk - Pedestrians

| Start Time              | Jenks Road Southbound |      |       |      | US 64 Westbound |      |       |      | Richardson Avenue Northbound |      |       |      | US 64 Eastbound |      |       |      | Exclu. Total | Inclu. Total | Int. Total |
|-------------------------|-----------------------|------|-------|------|-----------------|------|-------|------|------------------------------|------|-------|------|-----------------|------|-------|------|--------------|--------------|------------|
|                         | Left                  | Thru | Right | Peds | Left            | Thru | Right | Peds | Left                         | Thru | Right | Peds | Left            | Thru | Right | Peds |              |              |            |
| 07:00 AM                | 0                     | 0    | 19    | 0    | 22              | 174  | 18    | 0    | 0                            | 0    | 31    | 0    | 17              | 228  | 1     | 0    | 0            | 510          | 510        |
| 07:15 AM                | 0                     | 0    | 29    | 0    | 38              | 222  | 10    | 0    | 0                            | 0    | 55    | 0    | 31              | 239  | 4     | 0    | 0            | 628          | 628        |
| 07:30 AM                | 0                     | 0    | 13    | 0    | 22              | 244  | 16    | 0    | 0                            | 0    | 67    | 0    | 19              | 275  | 5     | 0    | 0            | 661          | 661        |
| 07:45 AM                | 0                     | 0    | 21    | 0    | 41              | 257  | 17    | 0    | 0                            | 0    | 55    | 0    | 15              | 257  | 6     | 0    | 0            | 669          | 669        |
| Total                   | 0                     | 0    | 82    | 0    | 123             | 897  | 61    | 0    | 0                            | 0    | 208   | 0    | 82              | 999  | 16    | 0    | 0            | 2468         | 2468       |
| 08:00 AM                | 0                     | 0    | 25    | 0    | 40              | 210  | 15    | 0    | 0                            | 0    | 67    | 0    | 12              | 249  | 6     | 0    | 0            | 624          | 624        |
| 08:15 AM                | 0                     | 0    | 25    | 0    | 39              | 230  | 25    | 0    | 0                            | 0    | 43    | 0    | 17              | 226  | 6     | 0    | 0            | 611          | 611        |
| 08:30 AM                | 0                     | 0    | 22    | 0    | 31              | 242  | 21    | 0    | 0                            | 0    | 55    | 0    | 14              | 209  | 4     | 0    | 0            | 598          | 598        |
| 08:45 AM                | 0                     | 0    | 18    | 0    | 24              | 185  | 17    | 0    | 0                            | 0    | 59    | 0    | 17              | 192  | 5     | 0    | 0            | 517          | 517        |
| Total                   | 0                     | 0    | 90    | 0    | 134             | 867  | 78    | 0    | 0                            | 0    | 224   | 0    | 60              | 876  | 21    | 0    | 0            | 2350         | 2350       |
| *** BREAK ***           |                       |      |       |      |                 |      |       |      |                              |      |       |      |                 |      |       |      |              |              |            |
| 04:00 PM                | 0                     | 0    | 29    | 0    | 29              | 280  | 11    | 0    | 0                            | 0    | 39    | 0    | 14              | 223  | 6     | 0    | 0            | 631          | 631        |
| 04:15 PM                | 0                     | 0    | 30    | 0    | 41              | 295  | 11    | 0    | 0                            | 0    | 43    | 0    | 21              | 226  | 6     | 0    | 0            | 673          | 673        |
| 04:30 PM                | 0                     | 0    | 26    | 0    | 35              | 271  | 11    | 0    | 0                            | 0    | 53    | 0    | 14              | 268  | 4     | 0    | 0            | 682          | 682        |
| 04:45 PM                | 0                     | 0    | 25    | 0    | 59              | 255  | 21    | 0    | 0                            | 0    | 45    | 0    | 16              | 238  | 6     | 0    | 0            | 665          | 665        |
| Total                   | 0                     | 0    | 110   | 0    | 164             | 1101 | 54    | 0    | 0                            | 0    | 180   | 0    | 65              | 955  | 22    | 0    | 0            | 2651         | 2651       |
| 05:00 PM                | 0                     | 0    | 41    | 0    | 52              | 313  | 17    | 0    | 0                            | 0    | 51    | 0    | 17              | 291  | 6     | 0    | 0            | 788          | 788        |
| 05:15 PM                | 0                     | 0    | 42    | 0    | 42              | 330  | 24    | 0    | 0                            | 0    | 50    | 0    | 16              | 297  | 7     | 0    | 0            | 808          | 808        |
| 05:30 PM                | 0                     | 0    | 40    | 0    | 60              | 281  | 16    | 0    | 0                            | 0    | 60    | 0    | 24              | 262  | 12    | 0    | 0            | 755          | 755        |
| 05:45 PM                | 0                     | 0    | 37    | 0    | 42              | 265  | 13    | 0    | 0                            | 0    | 42    | 0    | 17              | 282  | 5     | 0    | 0            | 703          | 703        |
| Total                   | 0                     | 0    | 160   | 0    | 196             | 1189 | 70    | 0    | 0                            | 0    | 203   | 0    | 74              | 1132 | 30    | 0    | 0            | 3054         | 3054       |
| Grand Total             | 0                     | 0    | 442   | 0    | 617             | 4054 | 263   | 0    | 0                            | 0    | 815   | 0    | 281             | 3962 | 89    | 0    | 0            | 10523        | 10523      |
| Apprch %                | 0                     | 0    | 100   |      | 12.5            | 82.2 | 5.3   |      | 0                            | 0    | 100   |      | 6.5             | 91.5 | 2.1   |      |              |              |            |
| Total %                 | 0                     | 0    | 4.2   |      | 5.9             | 38.5 | 2.5   |      | 0                            | 0    | 7.7   |      | 2.7             | 37.7 | 0.8   |      | 0            | 100          |            |
| Passenger Vehicles      | 0                     | 0    | 417   |      | 599             | 3775 | 234   |      | 0                            | 0    | 788   |      | 265             | 3716 | 82    |      | 0            | 0            | 9876       |
| % Passenger Vehicles    | 0                     | 0    | 94.3  | 0    | 97.1            | 93.1 | 89    | 0    | 0                            | 0    | 96.7  | 0    | 94.3            | 93.8 | 92.1  | 0    | 0            | 0            | 93.9       |
| Single Unit             | 0                     | 0    | 22    |      | 13              | 163  | 23    |      | 0                            | 0    | 23    |      | 11              | 105  | 7     |      | 0            | 0            | 367        |
| % Single Unit           | 0                     | 0    | 5     | 0    | 2.1             | 4    | 8.7   | 0    | 0                            | 0    | 2.8   | 0    | 3.9             | 2.7  | 7.9   | 0    | 0            | 0            | 3.5        |
| TTST                    | 0                     | 0    | 3     |      | 5               | 116  | 6     |      | 0                            | 0    | 4     |      | 5               | 141  | 0     |      | 0            | 0            | 280        |
| % TTST                  | 0                     | 0    | 0.7   | 0    | 0.8             | 2.9  | 2.3   | 0    | 0                            | 0    | 0.5   | 0    | 1.8             | 3.6  | 0     | 0    | 0            | 0            | 2.7        |
| Bicycles on Crosswalk   | 0                     | 0    | 0     |      | 0               | 0    | 0     |      | 0                            | 0    | 0     |      | 0               | 0    | 0     |      | 0            | 0            | 0          |
| % Bicycles on Crosswalk | 0                     | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0                            | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |
| Pedestrians             | 0                     | 0    | 0     |      | 0               | 0    | 0     |      | 0                            | 0    | 0     |      | 0               | 0    | 0     |      | 0            | 0            | 0          |
| % Pedestrians           | 0                     | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0                            | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |

# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

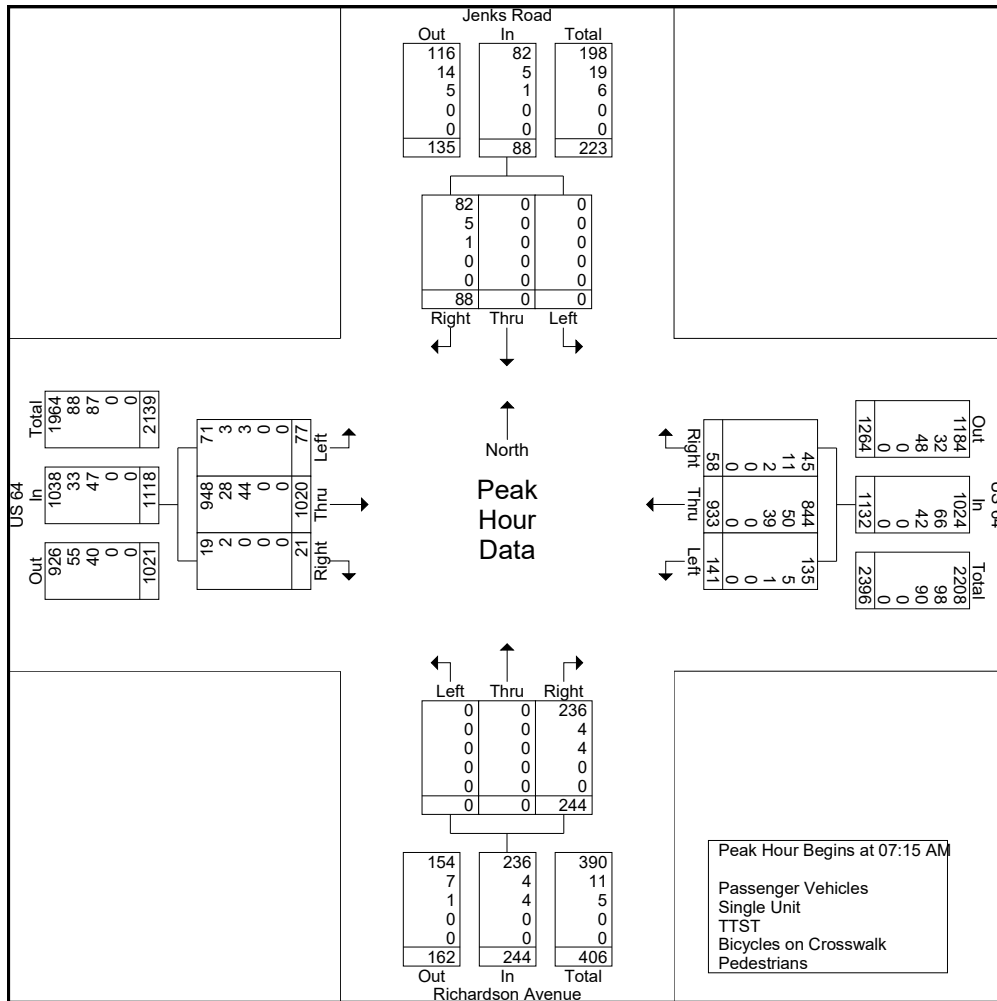
File Name : US64@Richardson

Site Code :

Start Date : 11/5/2020

Page No : 2

| Start Time   | Jenks Road Southbound |      |       |            | US 64 Westbound |      |       |            | Richardson Avenue Northbound |      |       |            | US 64 Eastbound |      |       |            | Int. Total |
|--|-----------------------|------|-------|------------|-----------------|------|-------|------------|------------------------------|------|-------|------------|-----------------|------|-------|------------|------------|
|  | Left                  | Thru | Right | App. Total | Left            | Thru | Right | App. Total | Left                         | Thru | Right | App. Total | Left            | Thru | Right | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                       |      |       |            |                 |      |       |            |                              |      |       |            |                 |      |       |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                       |      |       |            |                 |      |       |            |                              |      |       |            |                 |      |       |            |            |
| 07:15 AM   | 0                     | 0    | 29    | 29         | 38              | 222  | 10    | 270        | 0                            | 0    | 55    | 55         | 31              | 239  | 4     | 274        | 628        |
| 07:30 AM   | 0                     | 0    | 13    | 13         | 22              | 244  | 16    | 282        | 0                            | 0    | 67    | 67         | 19              | 275  | 5     | 299        | 661        |
| 07:45 AM   | 0                     | 0    | 21    | 21         | 41              | 257  | 17    | 315        | 0                            | 0    | 55    | 55         | 15              | 257  | 6     | 278        | 669        |
| 08:00 AM   | 0                     | 0    | 25    | 25         | 40              | 210  | 15    | 265        | 0                            | 0    | 67    | 67         | 12              | 249  | 6     | 267        | 624        |
| Total Volume   | 0                     | 0    | 88    | 88         | 141             | 933  | 58    | 1132       | 0                            | 0    | 244   | 244        | 77              | 1020 | 21    | 1118       | 2582       |
| % App. Total   | 0                     | 0    | 100   |            | 12.5            | 82.4 | 5.1   |            | 0                            | 0    | 100   |            | 6.9             | 91.2 | 1.9   |            |            |
| PHF  | .000                  | .000 | .759  | .759       | .860            | .908 | .853  | .898       | .000                         | .000 | .910  | .910       | .621            | .927 | .875  | .935       | .965       |
| Passenger Vehicles   | 0                     | 0    | 82    | 82         | 135             | 844  | 45    | 1024       | 0                            | 0    | 236   | 236        | 71              | 948  | 19    | 1038       | 2380       |
| % Passenger Vehicles                                       | 0                     | 0    | 93.2  | 93.2       | 95.7            | 90.5 | 77.6  | 90.5       | 0                            | 0    | 96.7  | 96.7       | 92.2            | 92.9 | 90.5  | 92.8       | 92.2       |
| Single Unit  | 0                     | 0    | 5     | 5          | 5               | 50   | 11    | 66         | 0                            | 0    | 4     | 4          | 3               | 28   | 2     | 33         | 108        |
| % Single Unit  | 0                     | 0    | 5.7   | 5.7        | 3.5             | 5.4  | 19.0  | 5.8        | 0                            | 0    | 1.6   | 1.6        | 3.9             | 2.7  | 9.5   | 3.0        | 4.2        |
| TTST   | 0                     | 0    | 1     | 1          | 1               | 39   | 2     | 42         | 0                            | 0    | 4     | 4          | 3               | 44   | 0     | 47         | 94         |
| % TTST   | 0                     | 0    | 1.1   | 1.1        | 0.7             | 4.2  | 3.4   | 3.7        | 0                            | 0    | 1.6   | 1.6        | 3.9             | 4.3  | 0     | 4.2        | 3.6        |
| Bicycles on Crosswalk                                      | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| Pedestrians  | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| % Pedestrians  | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |



# VHB Engineering NC, P.C.

Venture I

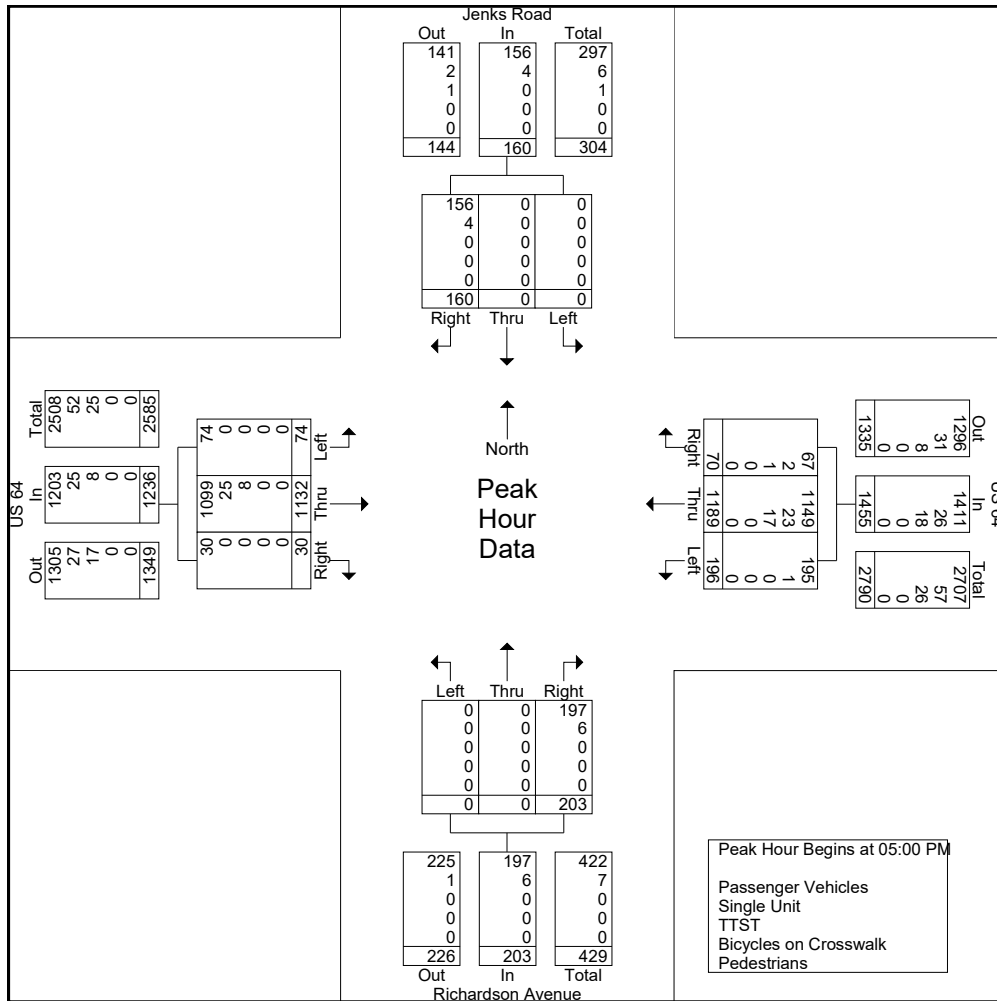
940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : US64@Richardson  
 Site Code :  
 Start Date : 11/5/2020  
 Page No : 3

| Start Time   | Jenks Road Southbound |      |       |            | US 64 Westbound |      |       |            | Richardson Avenue Northbound |      |       |            | US 64 Eastbound |      |       |            | Int. Total |
|--|-----------------------|------|-------|------------|-----------------|------|-------|------------|------------------------------|------|-------|------------|-----------------|------|-------|------------|------------|
|  | Left                  | Thru | Right | App. Total | Left            | Thru | Right | App. Total | Left                         | Thru | Right | App. Total | Left            | Thru | Right | App. Total |            |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                       |      |       |            |                 |      |       |            |                              |      |       |            |                 |      |       |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                       |      |       |            |                 |      |       |            |                              |      |       |            |                 |      |       |            |            |
| 05:00 PM   | 0                     | 0    | 41    | 41         | 52              | 313  | 17    | 382        | 0                            | 0    | 51    | 51         | 17              | 291  | 6     | 314        | 788        |
| 05:15 PM   | 0                     | 0    | 42    | 42         | 42              | 330  | 24    | 396        | 0                            | 0    | 50    | 50         | 16              | 297  | 7     | 320        | 808        |
| 05:30 PM   | 0                     | 0    | 40    | 40         | 60              | 281  | 16    | 357        | 0                            | 0    | 60    | 60         | 24              | 262  | 12    | 298        | 755        |
| 05:45 PM   | 0                     | 0    | 37    | 37         | 42              | 265  | 13    | 320        | 0                            | 0    | 42    | 42         | 17              | 282  | 5     | 304        | 703        |
| Total Volume   | 0                     | 0    | 160   | 160        | 196             | 1189 | 70    | 1455       | 0                            | 0    | 203   | 203        | 74              | 1132 | 30    | 1236       | 3054       |
| % App. Total   | 0                     | 0    | 100   |            | 13.5            | 81.7 | 4.8   |            | 0                            | 0    | 100   |            | 6               | 91.6 | 2.4   |            |            |
| PHF  | .000                  | .000 | .952  | .952       | .817            | .901 | .729  | .919       | .000                         | .000 | .846  | .846       | .771            | .953 | .625  | .966       | .945       |
| Passenger Vehicles   | 0                     | 0    | 156   | 156        | 195             | 1149 | 67    | 1411       | 0                            | 0    | 197   | 197        | 74              | 1099 | 30    | 1203       | 2967       |
| % Passenger Vehicles                                       | 0                     | 0    | 97.5  | 97.5       | 99.5            | 96.6 | 95.7  | 97.0       | 0                            | 0    | 97.0  | 97.0       | 100             | 97.1 | 100   | 97.3       | 97.2       |
| Single Unit  | 0                     | 0    | 4     | 4          | 1               | 23   | 2     | 26         | 0                            | 0    | 6     | 6          | 0               | 25   | 0     | 25         | 61         |
| % Single Unit  | 0                     | 0    | 2.5   | 2.5        | 0.5             | 1.9  | 2.9   | 1.8        | 0                            | 0    | 3.0   | 3.0        | 0               | 2.2  | 0     | 2.0        | 2.0        |
| TTST   | 0                     | 0    | 0     | 0          | 0               | 17   | 1     | 18         | 0                            | 0    | 0     | 0          | 0               | 8    | 0     | 8          | 26         |
| % TTST   | 0                     | 0    | 0     | 0          | 0               | 1.4  | 1.4   | 1.2        | 0                            | 0    | 0     | 0          | 0               | 0.7  | 0     | 0.6        | 0.9        |
| Bicycles on Crosswalk                                      | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| Pedestrians  | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |
| % Pedestrians  | 0                     | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0                            | 0    | 0     | 0          | 0               | 0    | 0     | 0          | 0          |



# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

File Name : US64@U-turn\_E\_Richardson

Site Code :

Start Date : 11/5/2020

Page No : 1

## Groups Printed- Passenger Vehicles - Single Unit - TTST - Bicycles on Crosswalk - Pedestrians

| Start Time              | No Approach Southbound |      |       |      | US 64 Westbound |      |       |      | No Approach Northbound |      |       |      | US 64 Eastbound |      |       |      | Exclu. Total | Inclu. Total | Int. Total |
|-------------------------|------------------------|------|-------|------|-----------------|------|-------|------|------------------------|------|-------|------|-----------------|------|-------|------|--------------|--------------|------------|
|                         | Left                   | Thru | Right | Peds | Left            | Thru | Right | Peds | Left                   | Thru | Right | Peds | U-Turn          | Thru | Right | Peds |              |              |            |
| 07:00 AM                | 0                      | 0    | 1     | 0    | 0               | 218  | 0     | 0    | 0                      | 0    | 0     | 0    | 2               | 247  | 0     | 0    | 0            | 468          | 468        |
| 07:15 AM                | 0                      | 0    | 0     | 0    | 0               | 268  | 0     | 0    | 0                      | 0    | 0     | 0    | 5               | 302  | 0     | 0    | 0            | 575          | 575        |
| 07:30 AM                | 0                      | 0    | 3     | 0    | 0               | 278  | 0     | 0    | 0                      | 0    | 0     | 0    | 8               | 315  | 0     | 0    | 0            | 604          | 604        |
| 07:45 AM                | 0                      | 0    | 0     | 0    | 0               | 309  | 0     | 0    | 0                      | 0    | 0     | 0    | 4               | 272  | 0     | 0    | 0            | 585          | 585        |
| Total                   | 0                      | 0    | 4     | 0    | 0               | 1073 | 0     | 0    | 0                      | 0    | 0     | 0    | 19              | 1136 | 0     | 0    | 0            | 2232         | 2232       |
| 08:00 AM                | 0                      | 0    | 0     | 0    | 0               | 273  | 0     | 0    | 0                      | 0    | 0     | 0    | 7               | 331  | 0     | 0    | 0            | 611          | 611        |
| 08:15 AM                | 0                      | 0    | 0     | 0    | 0               | 283  | 0     | 0    | 0                      | 0    | 0     | 0    | 8               | 264  | 0     | 0    | 0            | 555          | 555        |
| 08:30 AM                | 0                      | 0    | 0     | 0    | 0               | 305  | 0     | 0    | 0                      | 0    | 0     | 0    | 6               | 261  | 0     | 0    | 0            | 572          | 572        |
| 08:45 AM                | 0                      | 0    | 0     | 0    | 0               | 203  | 0     | 0    | 0                      | 0    | 0     | 0    | 7               | 239  | 0     | 0    | 0            | 449          | 449        |
| Total                   | 0                      | 0    | 0     | 0    | 0               | 1064 | 0     | 0    | 0                      | 0    | 0     | 0    | 28              | 1095 | 0     | 0    | 0            | 2187         | 2187       |
| *** BREAK ***           |                        |      |       |      |                 |      |       |      |                        |      |       |      |                 |      |       |      |              |              |            |
| 04:00 PM                | 0                      | 0    | 0     | 0    | 0               | 324  | 0     | 0    | 0                      | 0    | 0     | 0    | 6               | 263  | 0     | 0    | 0            | 593          | 593        |
| 04:15 PM                | 0                      | 0    | 0     | 0    | 0               | 349  | 0     | 0    | 0                      | 0    | 0     | 0    | 5               | 266  | 0     | 0    | 0            | 620          | 620        |
| 04:30 PM                | 0                      | 0    | 0     | 0    | 0               | 303  | 0     | 0    | 0                      | 0    | 0     | 0    | 9               | 311  | 0     | 0    | 0            | 623          | 623        |
| 04:45 PM                | 0                      | 0    | 0     | 0    | 0               | 330  | 0     | 0    | 0                      | 0    | 0     | 0    | 7               | 277  | 0     | 0    | 0            | 614          | 614        |
| Total                   | 0                      | 0    | 0     | 0    | 0               | 1306 | 0     | 0    | 0                      | 0    | 0     | 0    | 27              | 1117 | 0     | 0    | 0            | 2450         | 2450       |
| 05:00 PM                | 0                      | 0    | 3     | 0    | 0               | 376  | 0     | 0    | 0                      | 0    | 0     | 0    | 10              | 341  | 0     | 0    | 0            | 730          | 730        |
| 05:15 PM                | 0                      | 0    | 1     | 0    | 0               | 394  | 0     | 0    | 0                      | 0    | 0     | 0    | 10              | 334  | 0     | 0    | 0            | 739          | 739        |
| 05:30 PM                | 0                      | 0    | 2     | 0    | 0               | 363  | 0     | 0    | 0                      | 0    | 0     | 0    | 12              | 294  | 0     | 0    | 0            | 671          | 671        |
| 05:45 PM                | 0                      | 0    | 2     | 0    | 0               | 301  | 0     | 0    | 0                      | 0    | 0     | 0    | 9               | 294  | 0     | 0    | 0            | 606          | 606        |
| Total                   | 0                      | 0    | 8     | 0    | 0               | 1434 | 0     | 0    | 0                      | 0    | 0     | 0    | 41              | 1263 | 0     | 0    | 0            | 2746         | 2746       |
| Grand Total             | 0                      | 0    | 12    | 0    | 0               | 4877 | 0     | 0    | 0                      | 0    | 0     | 0    | 115             | 4611 | 0     | 0    | 0            | 9615         | 9615       |
| Apprch %                | 0                      | 0    | 100   |      | 0               | 100  | 0     | 0    | 0                      | 0    | 0     | 0    | 2.4             | 97.6 | 0     | 0    |              |              |            |
| Total %                 | 0                      | 0    | 0.1   |      | 0               | 50.7 | 0     | 0    | 0                      | 0    | 0     | 0    | 1.2             | 48   | 0     | 0    | 0            | 100          |            |
| Passenger Vehicles      | 0                      | 0    | 8     |      | 0               | 4597 | 0     | 0    | 0                      | 0    | 0     | 0    | 103             | 4370 | 0     | 0    | 0            | 0            | 9078       |
| % Passenger Vehicles    | 0                      | 0    | 66.7  | 0    | 0               | 94.3 | 0     | 0    | 0                      | 0    | 0     | 0    | 89.6            | 94.8 | 0     | 0    | 0            | 0            | 94.4       |
| Single Unit             | 0                      | 0    | 3     |      | 0               | 157  | 0     | 0    | 0                      | 0    | 0     | 0    | 11              | 125  | 0     | 0    | 0            | 0            | 296        |
| % Single Unit           | 0                      | 0    | 25    | 0    | 0               | 3.2  | 0     | 0    | 0                      | 0    | 0     | 0    | 9.6             | 2.7  | 0     | 0    | 0            | 0            | 3.1        |
| TTST                    | 0                      | 0    | 1     |      | 0               | 123  | 0     | 0    | 0                      | 0    | 0     | 0    | 1               | 116  | 0     | 0    | 0            | 0            | 241        |
| % TTST                  | 0                      | 0    | 8.3   | 0    | 0               | 2.5  | 0     | 0    | 0                      | 0    | 0     | 0    | 0.9             | 2.5  | 0     | 0    | 0            | 0            | 2.5        |
| Bicycles on Crosswalk   | 0                      | 0    | 0     |      | 0               | 0    | 0     | 0    | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |
| % Bicycles on Crosswalk | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |
| Pedestrians             | 0                      | 0    | 0     |      | 0               | 0    | 0     | 0    | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |
| % Pedestrians           | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0                      | 0    | 0     | 0    | 0               | 0    | 0     | 0    | 0            | 0            | 0          |



# VHB Engineering NC, P.C.

Venture I

940 Main Campus Drive, Suite 500

Raleigh, NC 27606

p: 919.829.0328 f: 919.833.0034

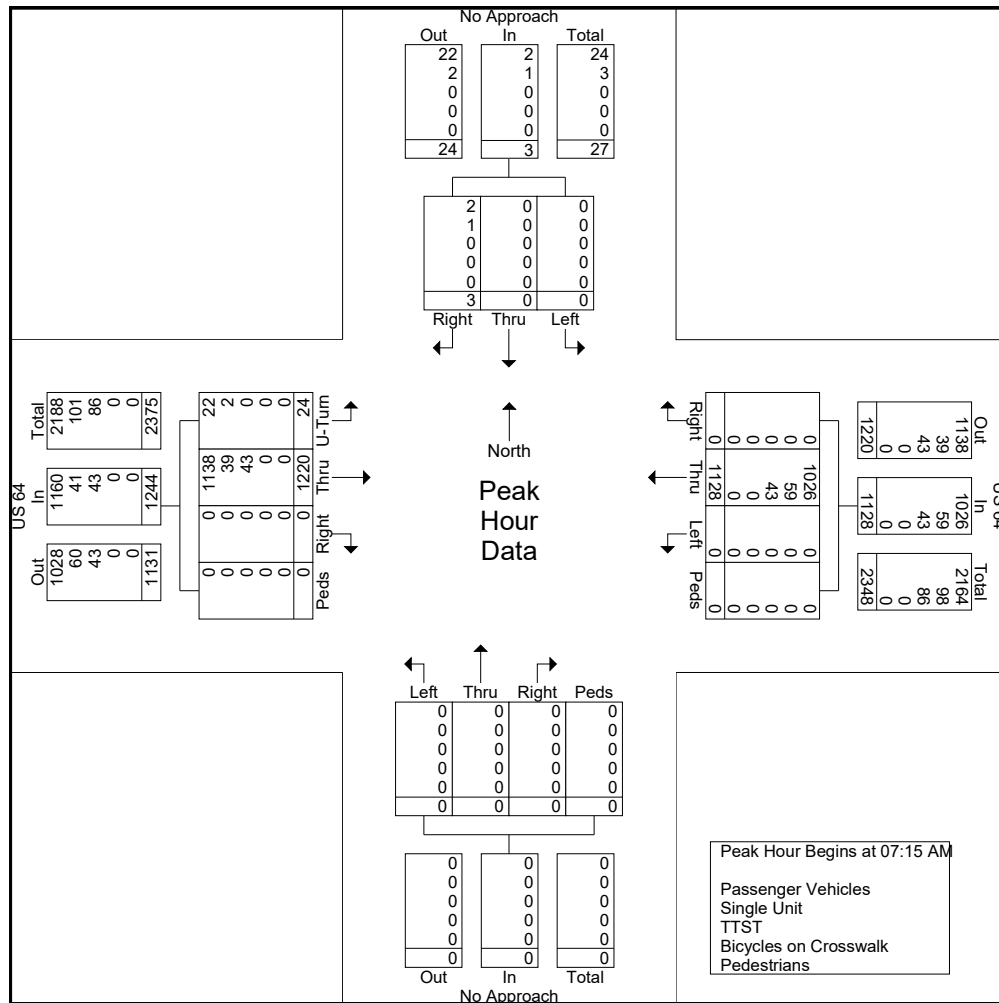
File Name : US64@U-turn\_E\_Richardson

Site Code :

Start Date : 11/5/2020

Page No : 2

| Start Time   | No Approach Southbound |      |       |            | US 64 Westbound |      |       |      |            | No Approach Northbound |      |       |      |            | US 64 Eastbound |      |       |      |            | Int. Total |
|--|------------------------|------|-------|------------|-----------------|------|-------|------|------------|------------------------|------|-------|------|------------|-----------------|------|-------|------|------------|------------|
|  | Left                   | Thru | Right | App. Total | Left            | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | U-Turn          | Thru | Right | Peds | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                        |      |       |            |                 |      |       |      |            |                        |      |       |      |            |                 |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                        |      |       |            |                 |      |       |      |            |                        |      |       |      |            |                 |      |       |      |            |            |
| 07:15 AM   | 0                      | 0    | 0     | 0          | 0               | 268  | 0     | 0    | 268        | 0                      | 0    | 0     | 0    | 0          | 5               | 302  | 0     | 0    | 307        | 575        |
| 07:30 AM   | 0                      | 0    | 3     | 3          | 0               | 278  | 0     | 0    | 278        | 0                      | 0    | 0     | 0    | 0          | 8               | 315  | 0     | 0    | 323        | 604        |
| 07:45 AM   | 0                      | 0    | 0     | 0          | 0               | 309  | 0     | 0    | 309        | 0                      | 0    | 0     | 0    | 0          | 4               | 272  | 0     | 0    | 276        | 585        |
| 08:00 AM   | 0                      | 0    | 0     | 0          | 0               | 273  | 0     | 0    | 273        | 0                      | 0    | 0     | 0    | 0          | 7               | 331  | 0     | 0    | 338        | 611        |
| Total Volume   | 0                      | 0    | 3     | 3          | 0               | 1128 | 0     | 0    | 1128       | 0                      | 0    | 0     | 0    | 0          | 24              | 1220 | 0     | 0    | 1244       | 2375       |
| % App. Total   | 0                      | 0    | 100   |            | 0               | 100  | 0     | 0    |            | 0                      | 0    | 0     | 0    |            | 1.9             | 98.1 | 0     | 0    |            |            |
| PHF  | .000                   | .000 | .250  | .250       | .000            | .913 | .000  | .000 | .913       | .000                   | .000 | .000  | .000 | .000       | .750            | .921 | .000  | .000 | .920       | .972       |
| Passenger Vehicles   | 0                      | 0    | 2     | 2          | 0               | 1026 | 0     | 0    | 1026       | 0                      | 0    | 0     | 0    | 0          | 22              | 1138 | 0     | 0    | 1160       | 2188       |
| % Passenger Vehicles                                       |                        |      |       |            |                 |      |       |      |            |                        |      |       |      |            |                 |      |       |      |            |            |
| Single Unit  | 0                      | 0    | 1     | 1          | 0               | 59   | 0     | 0    | 59         | 0                      | 0    | 0     | 0    | 0          | 2               | 39   | 0     | 0    | 41         | 101        |
| % Single Unit  | 0                      | 0    | 33.3  | 33.3       | 0               | 5.2  | 0     | 0    | 5.2        | 0                      | 0    | 0     | 0    | 0          | 8.3             | 3.2  | 0     | 0    | 3.3        | 4.3        |
| TTST   | 0                      | 0    | 0     | 0          | 0               | 43   | 0     | 0    | 43         | 0                      | 0    | 0     | 0    | 0          | 0               | 43   | 0     | 0    | 43         | 86         |
| % TTST   | 0                      | 0    | 0     | 0          | 0               | 3.8  | 0     | 0    | 3.8        | 0                      | 0    | 0     | 0    | 0          | 0               | 3.5  | 0     | 0    | 3.5        | 3.6        |
| Bicycles on Crosswalk                                      | 0                      | 0    | 0     | 0          | 0               | 0    | 0     | 0    | 0          | 0                      | 0    | 0     | 0    | 0          | 0               | 0    | 0     | 0    | 0          | 0          |
| % Bicycles on Crosswalk                                    | 0                      | 0    | 0     | 0          | 0               | 0    | 0     | 0    | 0          | 0                      | 0    | 0     | 0    | 0          | 0               | 0    | 0     | 0    | 0          | 0          |
| Pedestrians  | 0                      | 0    | 0     | 0          | 0               | 0    | 0     | 0    | 0          | 0                      | 0    | 0     | 0    | 0          | 0               | 0    | 0     | 0    | 0          | 0          |
| % Pedestrians  | 0                      | 0    | 0     | 0          | 0               | 0    | 0     | 0    | 0          | 0                      | 0    | 0     | 0    | 0          | 0               | 0    | 0     | 0    | 0          | 0          |



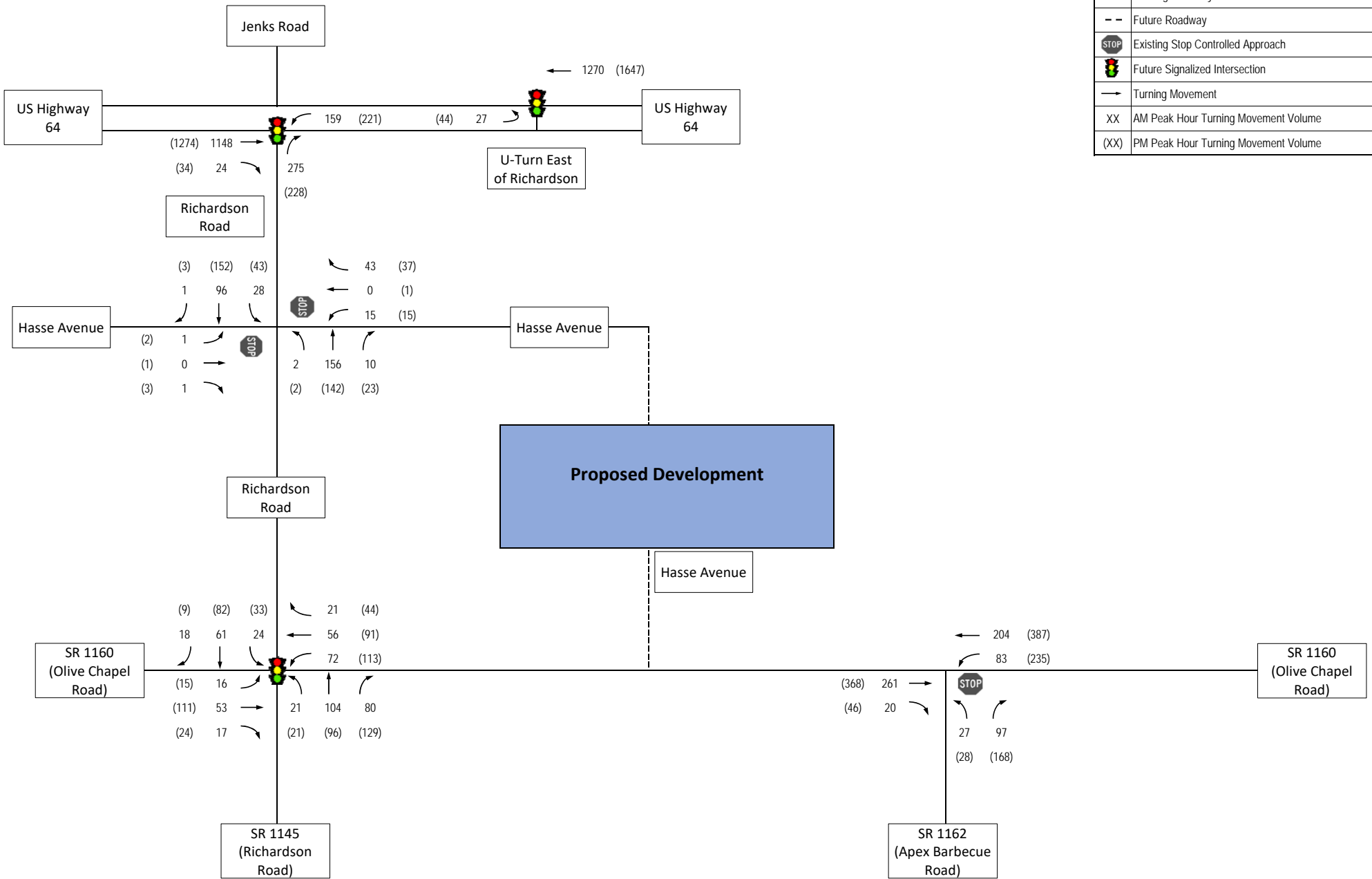




## **APPENDIX C:**

# **Background Projects**

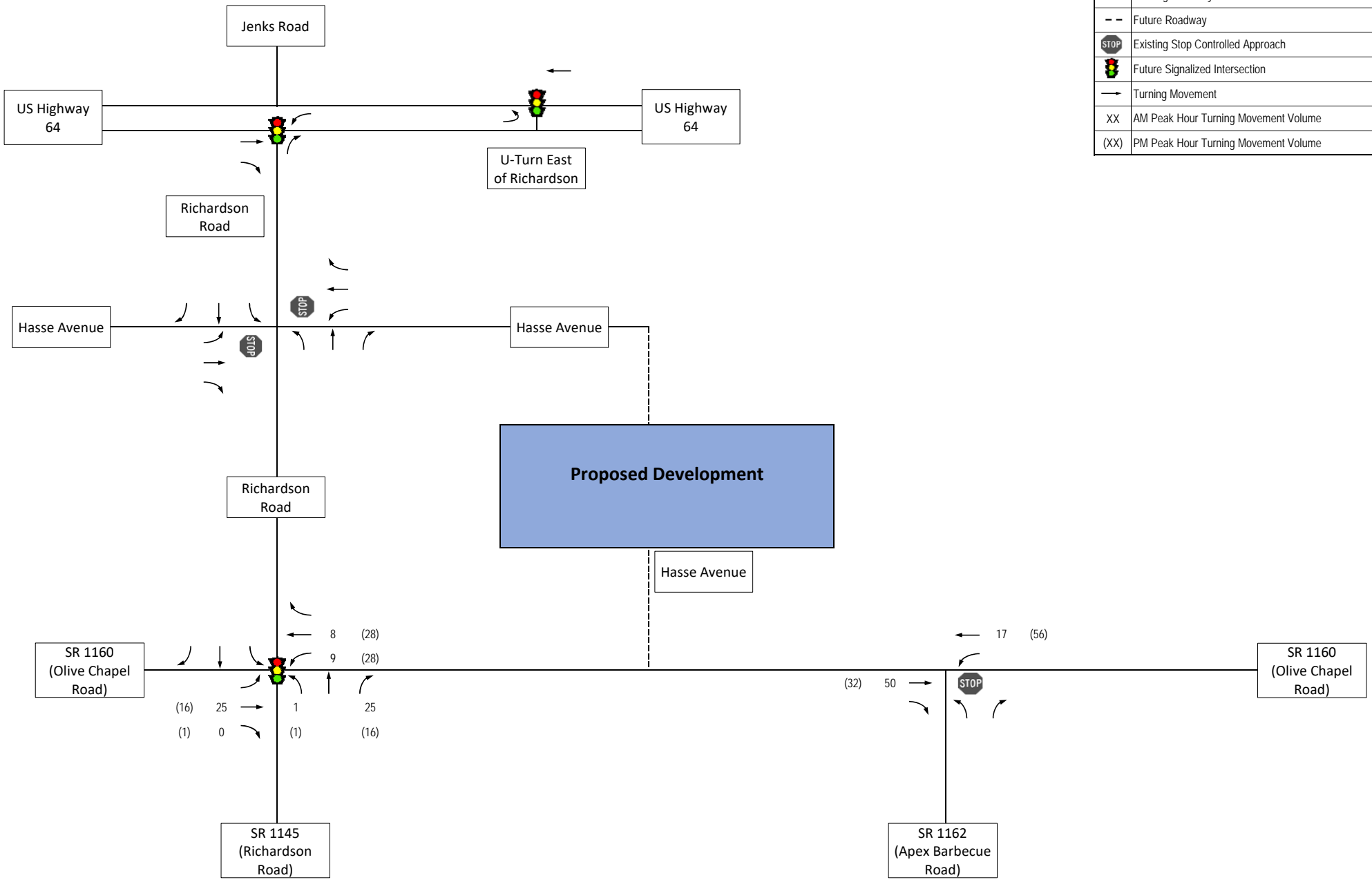
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-1**  
**Background (2020) AM and PM Peak Hour Turning Movement Volumes**

**Hackney Tract Subdivision**  
**Apex, NC**






| LEGEND |                                      |
|--------|--------------------------------------|
| —      | Existing Roadway                     |
| - -    | Future Roadway                       |
| STOP   | Existing Stop Controlled Approach    |
| 🚦      | Future Signalized Intersection       |
| →      | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |

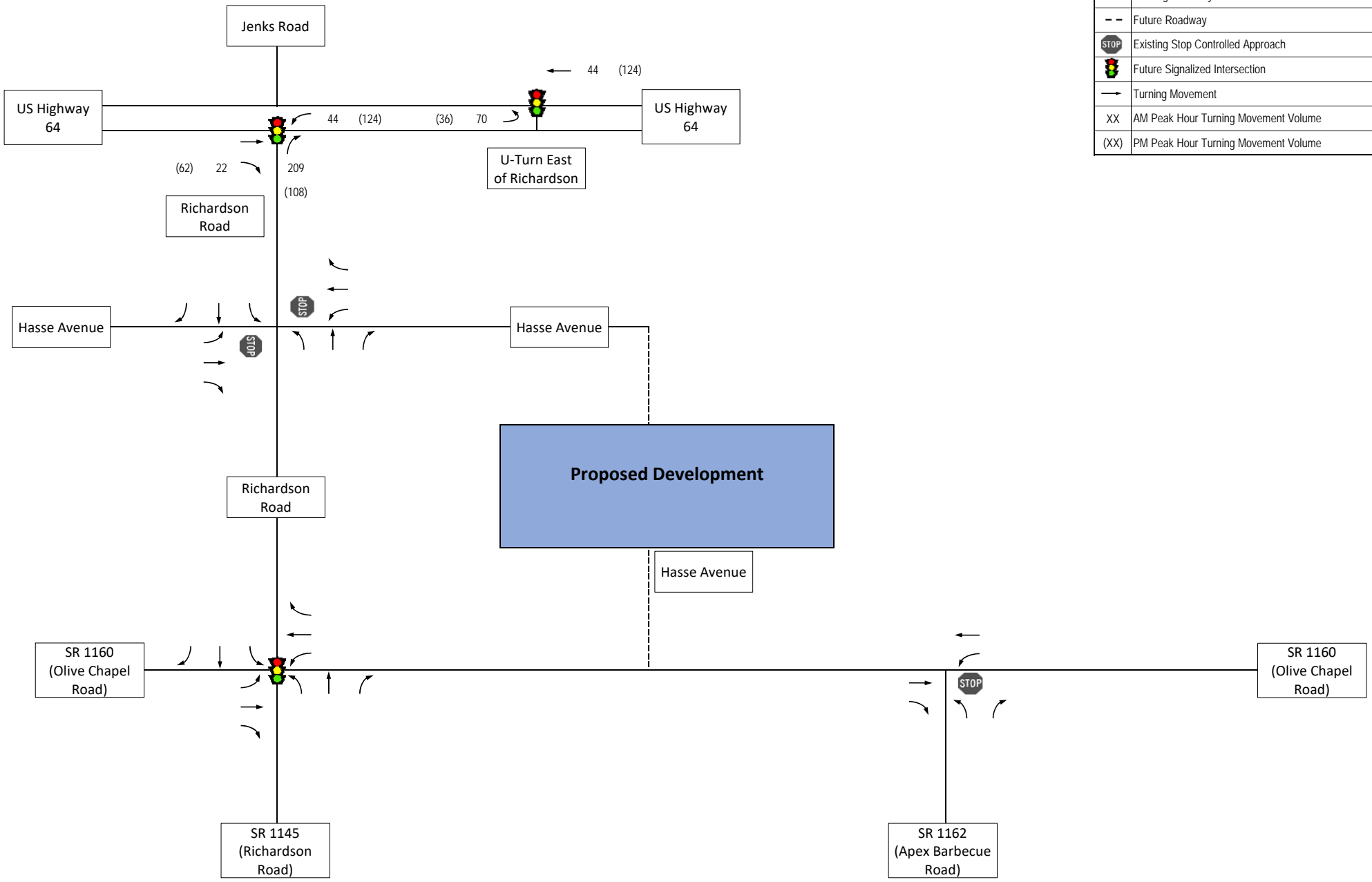


**Figure C-2**  
**Total Site Trips Due to Saddlebrook (Lawrence Assemblage)**

**Hackney Tract Subdivision**  
**Apex, NC**








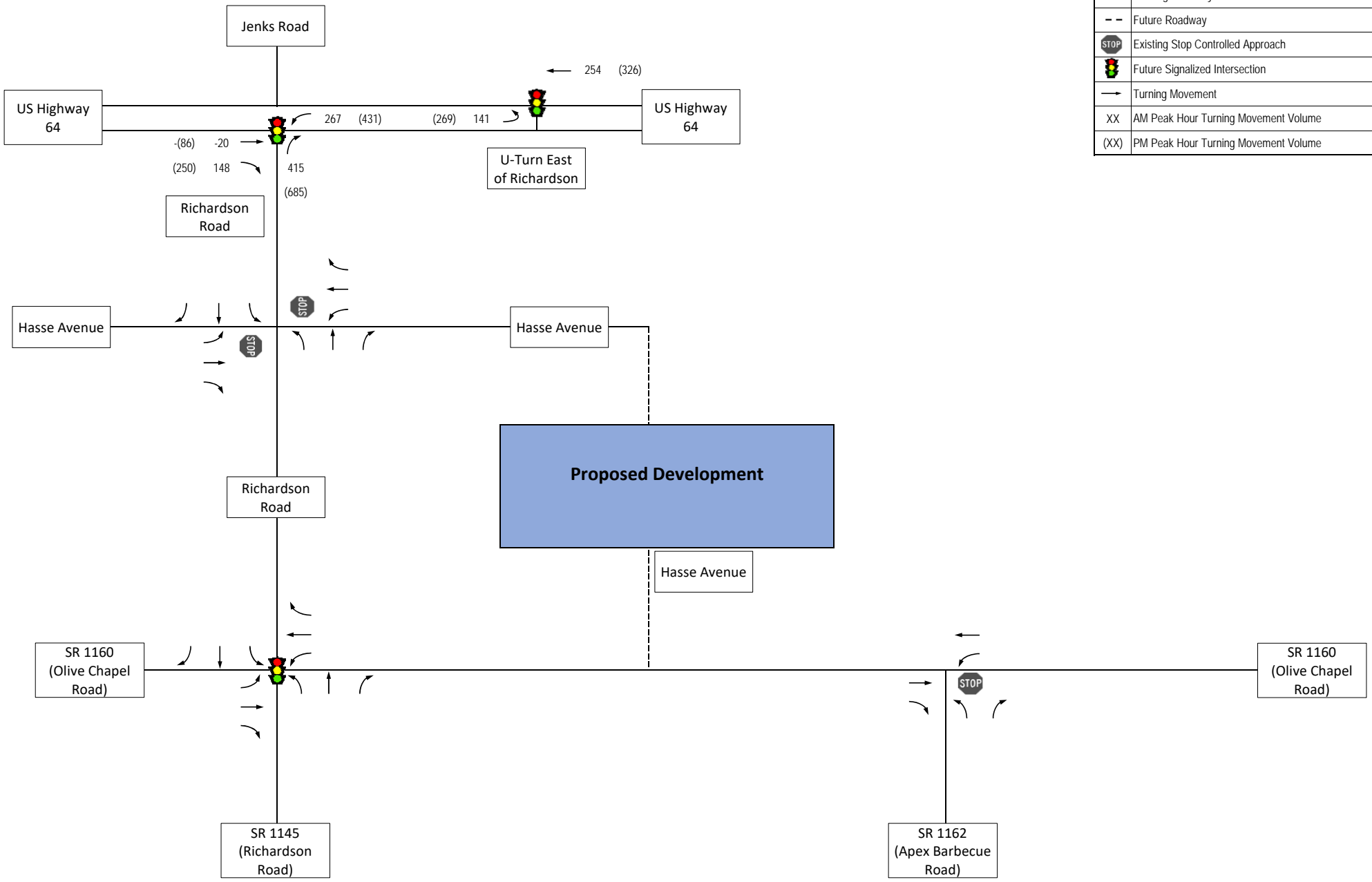
| LEGEND  |                                      |
|---|--------------------------------------|
|  | Existing Roadway                     |
|  | Future Roadway                       |
|  | Existing Stop Controlled Approach    |
|  | Future Signalized Intersection       |
|  | Turning Movement                     |
| XX  | AM Peak Hour Turning Movement Volume |
| (XX)  | PM Peak Hour Turning Movement Volume |



**Figure C-3**  
Residential Site Trips Due to Sweetwater



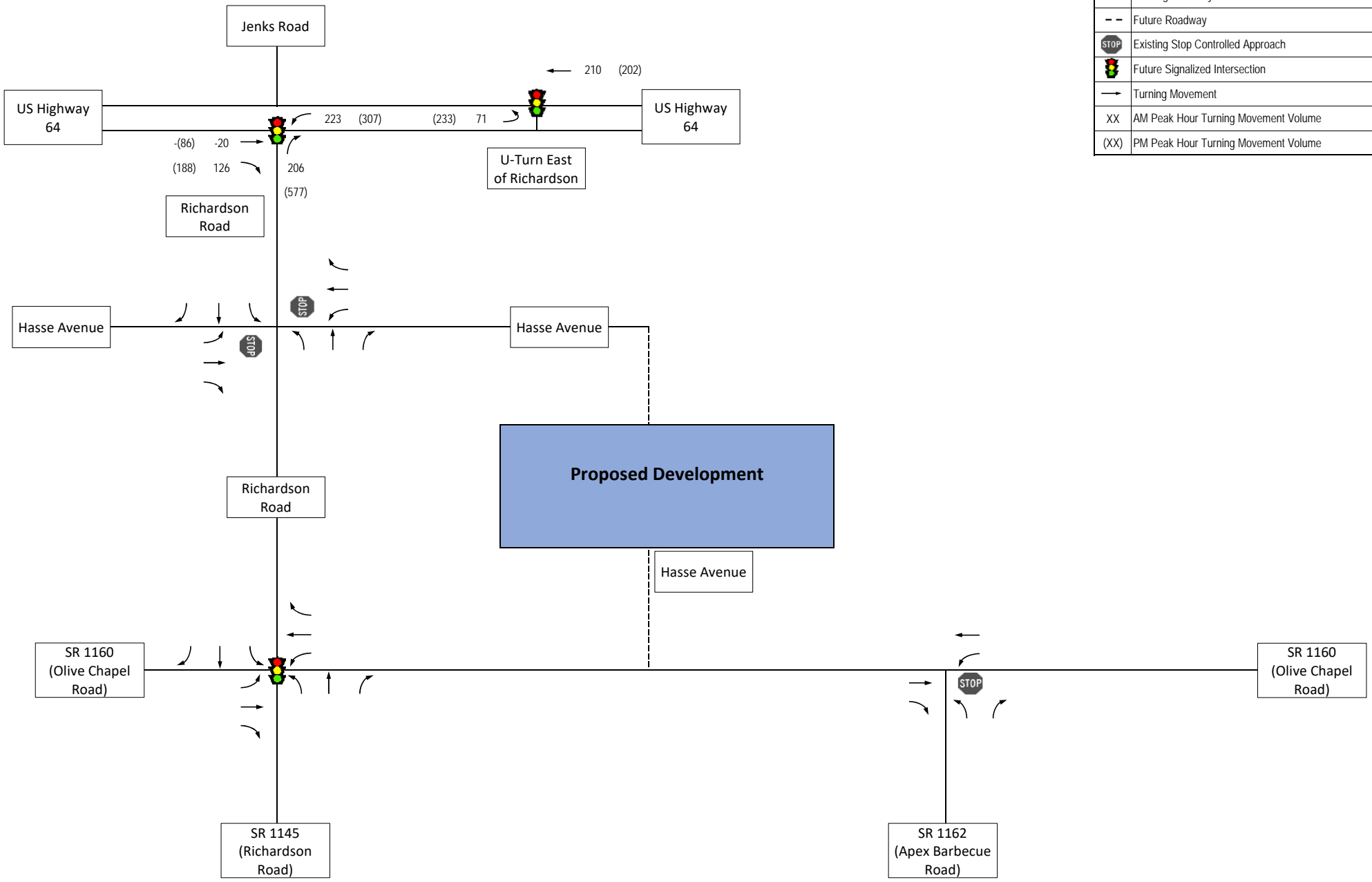
| LEGEND  |                                      |
|---|--------------------------------------|
|  | Existing Roadway                     |
|  | Future Roadway                       |
|  | Existing Stop Controlled Approach    |
|  | Future Signalized Intersection       |
|  | Turning Movement                     |
| XX  | AM Peak Hour Turning Movement Volume |
| (XX)  | PM Peak Hour Turning Movement Volume |



**Figure C-4A**  
Total Site Trips Due to Sweetwater

**Hackney Tract Subdivision**  
Apex, NC

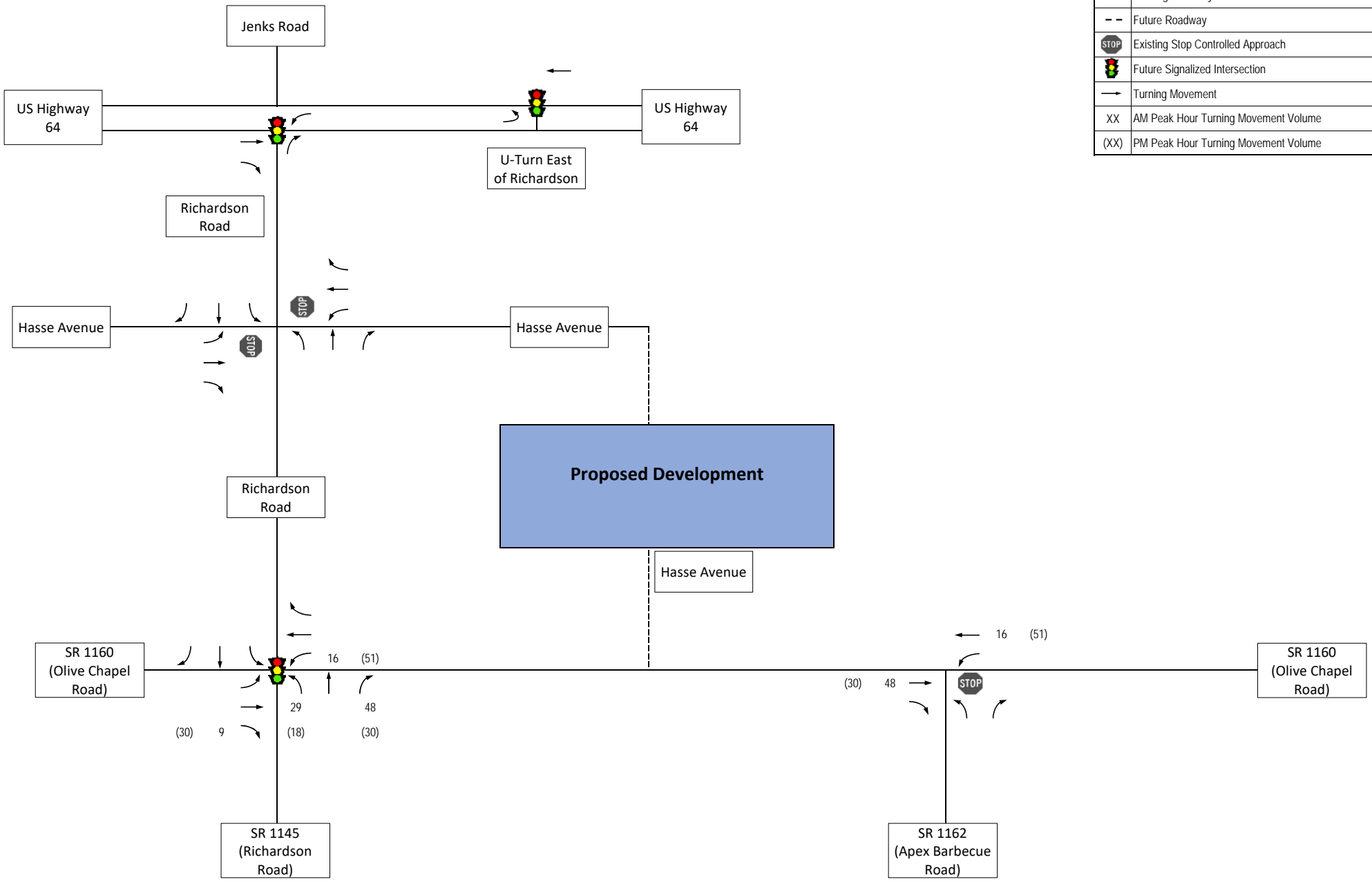
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-4B**  
**Mixed-Use Site Trips Due to Sweetwater**



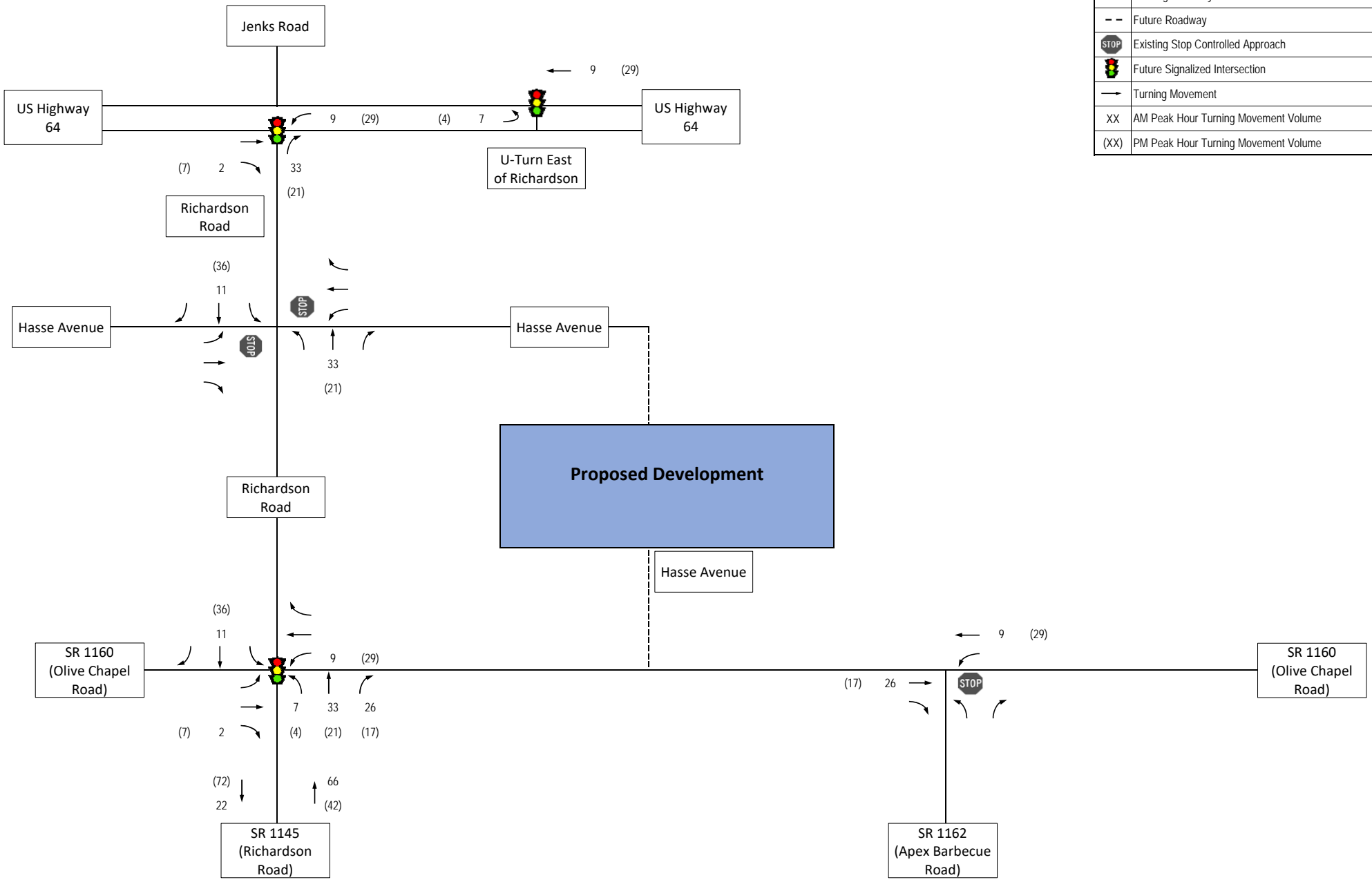
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-5**  
**Site Trips Due to Buckhorn Preserve (Goodwin-MacNair)**

**Hackney Tract Subdivision**  
**Apex, NC**

| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-6**  
**Site Trips Due to Stillwater (Womble)**





| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |

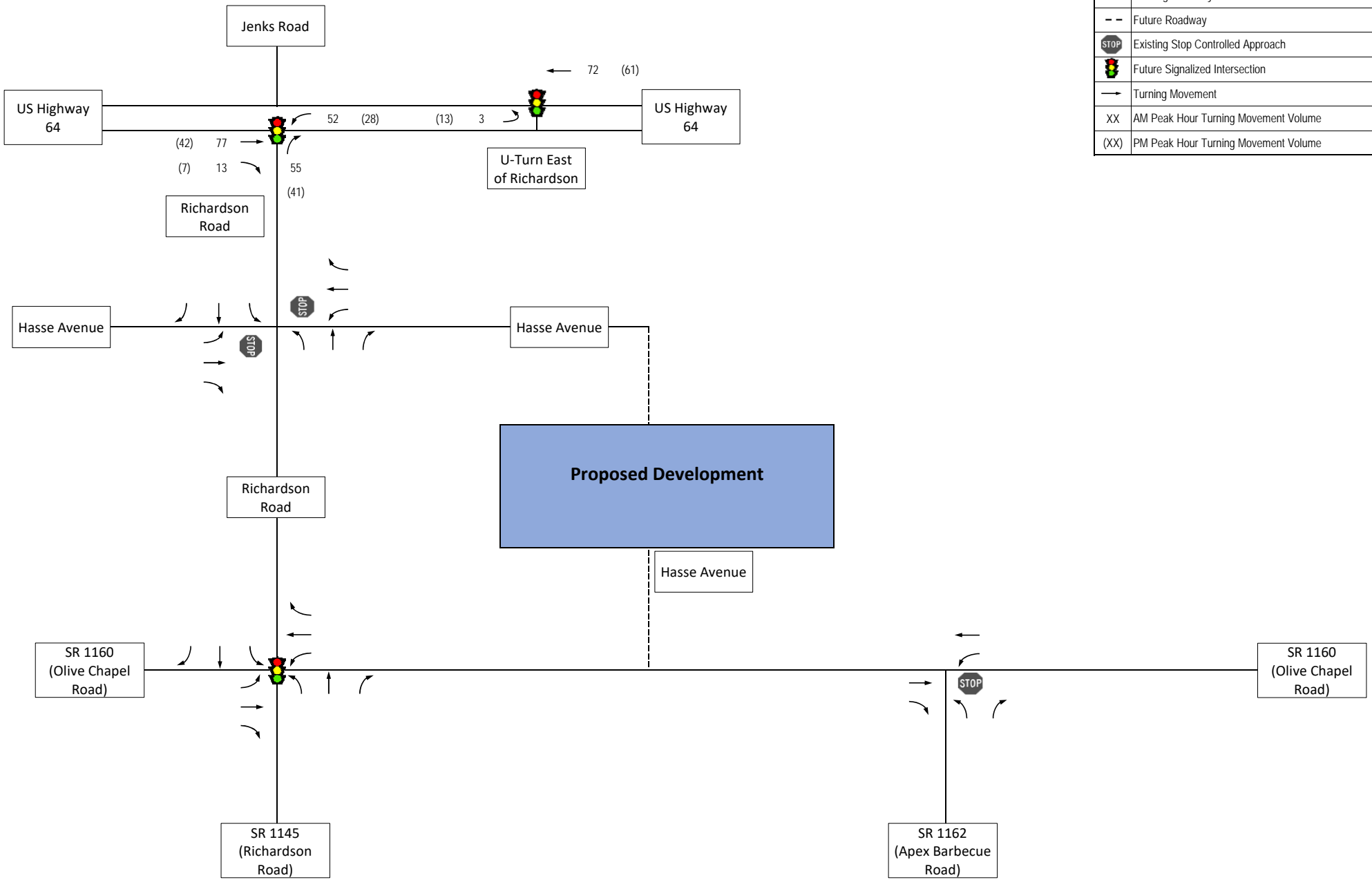
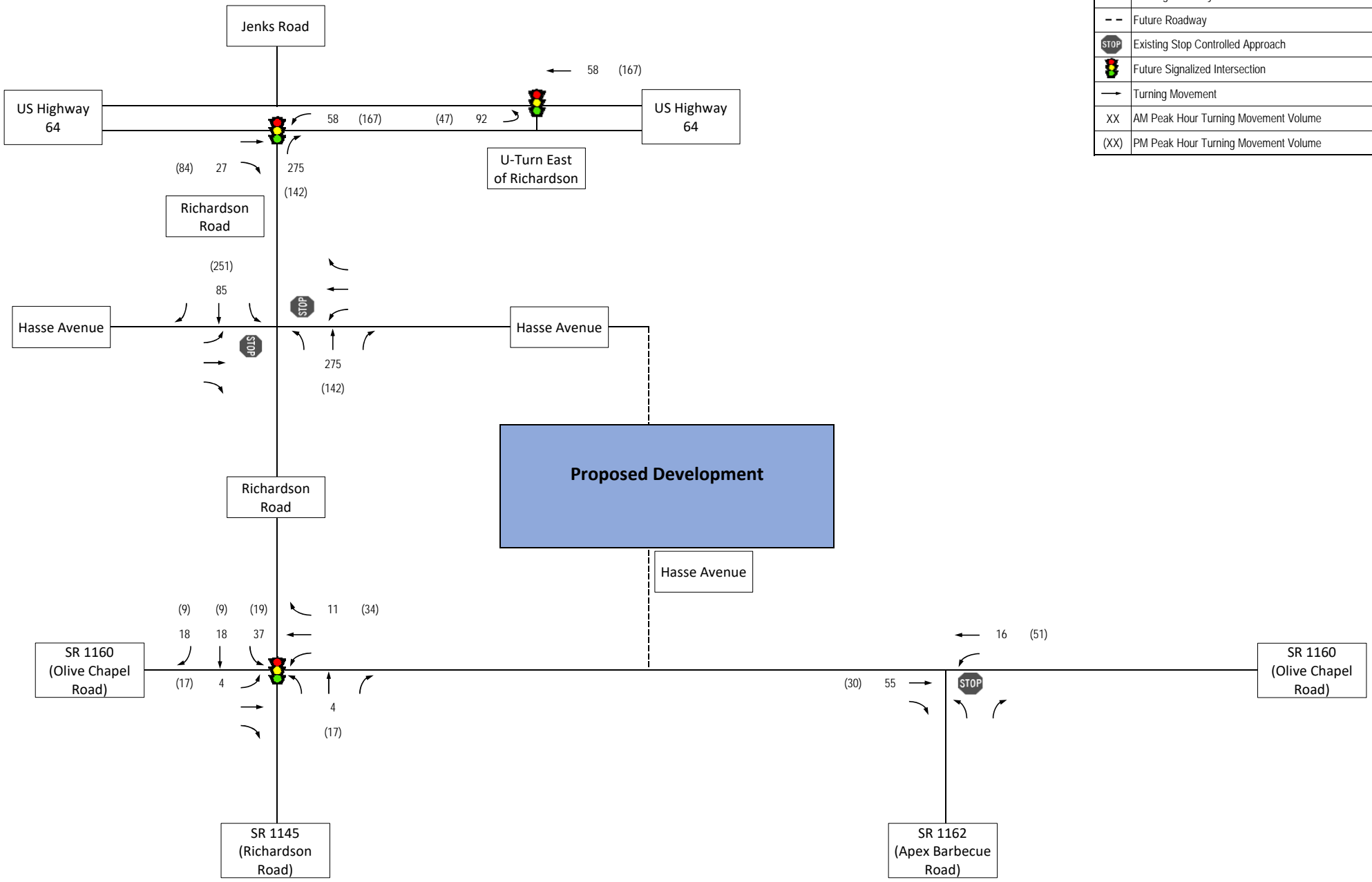


Figure C-7  
Site Trips Due to Westford

Hackney Tract Subdivision  
Apex, NC

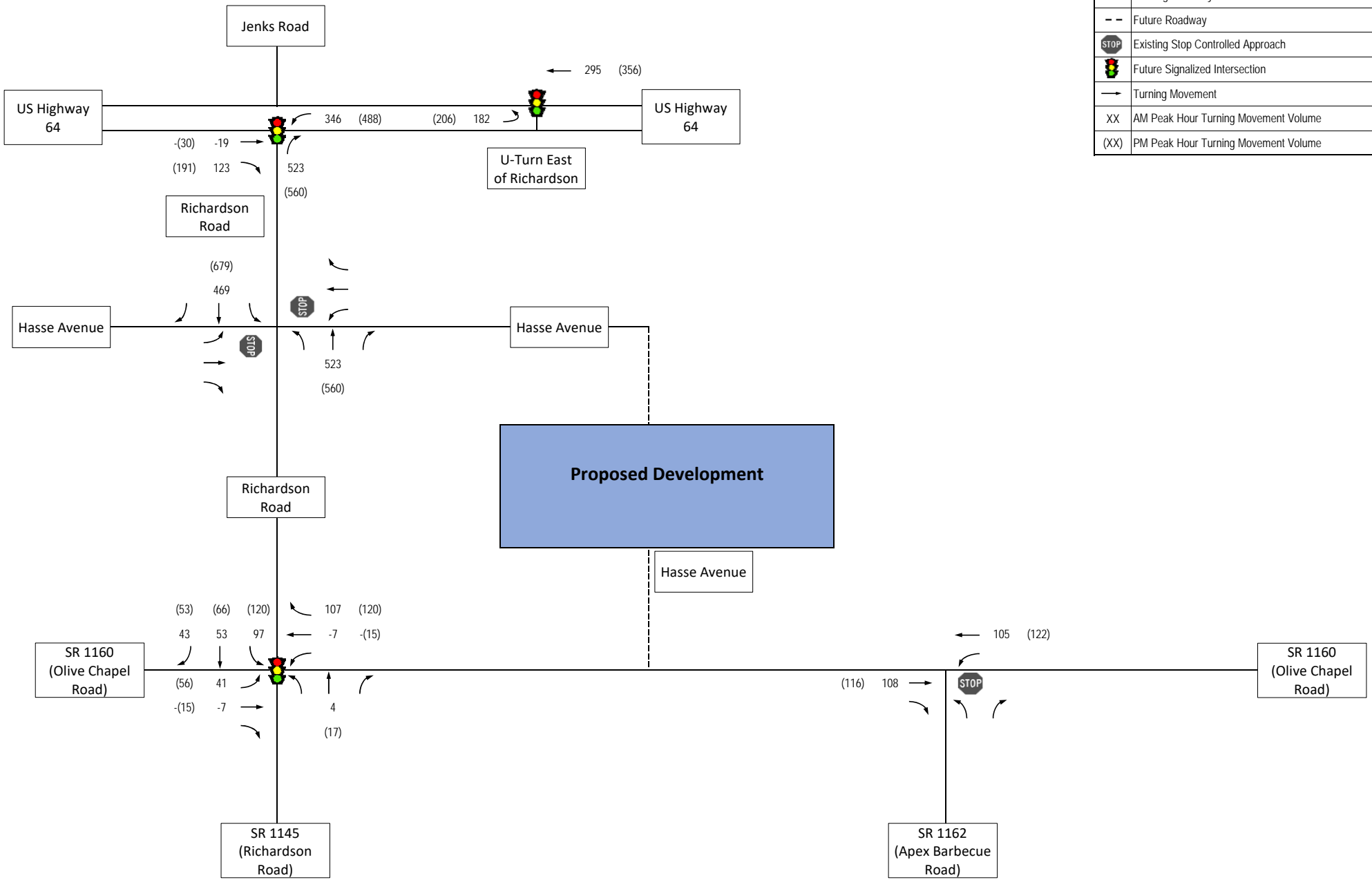
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-8**  
Residential Site Trips Due to Smith Farm

**Hackney Tract Subdivision**  
Apex, NC

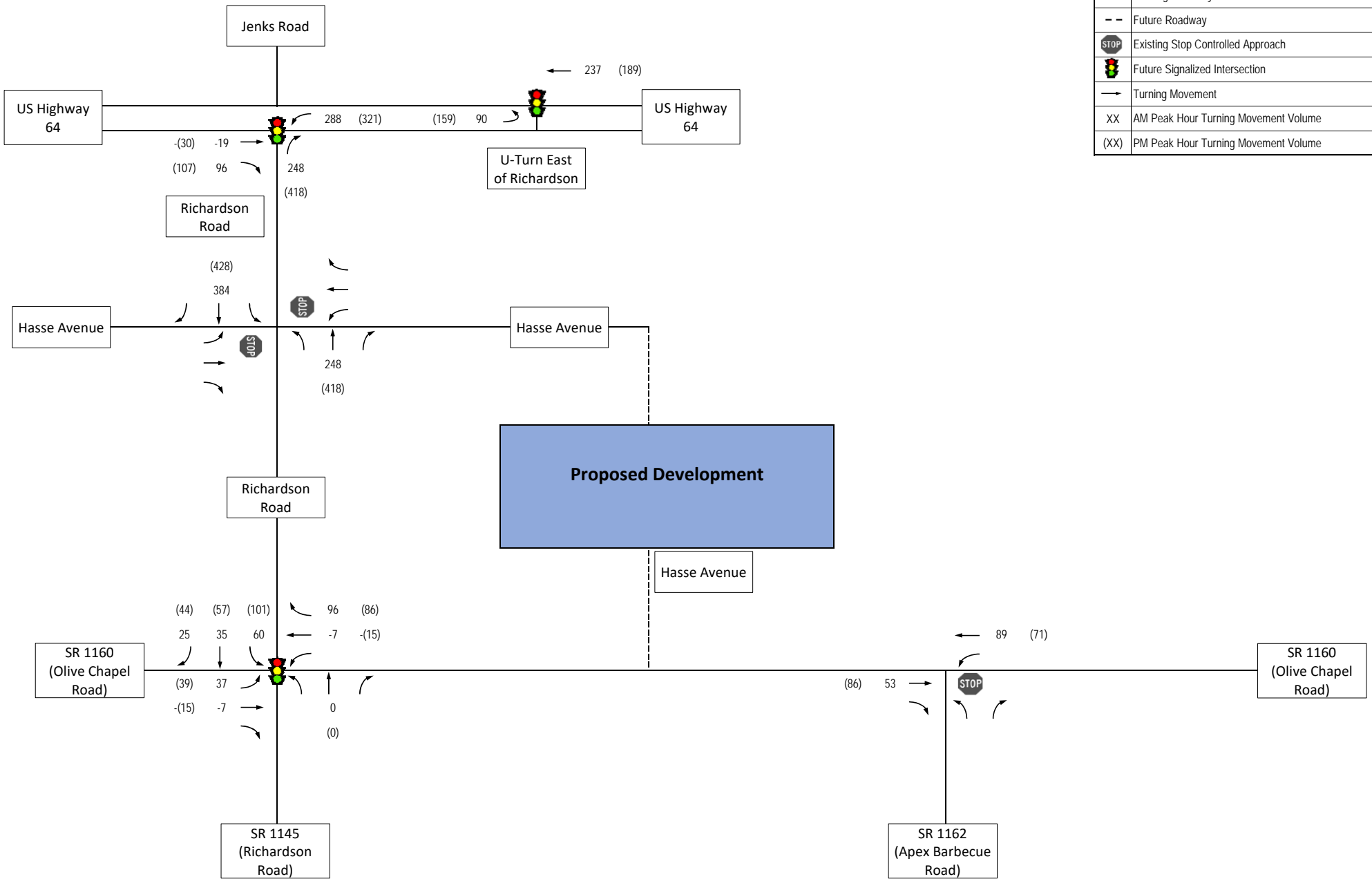
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-9A**  
Total Site Trips Due to Smith Farm

**Hackney Tract Subdivision**  
Apex, NC

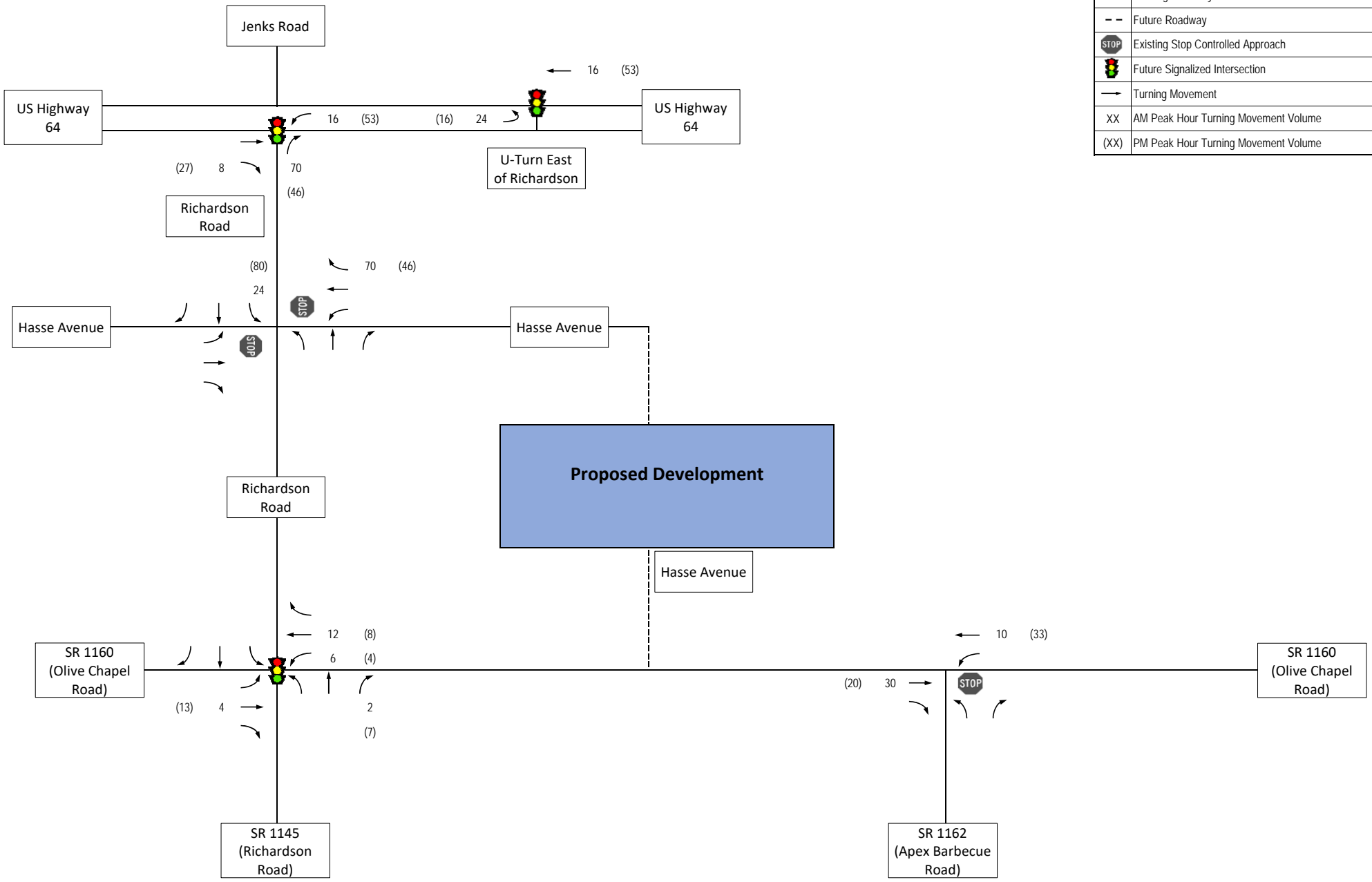
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-9B**  
**Mixed-Use Site Trips Due to Smith Farm**

**Hackney Tract Subdivision**  
**Apex, NC**

| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |

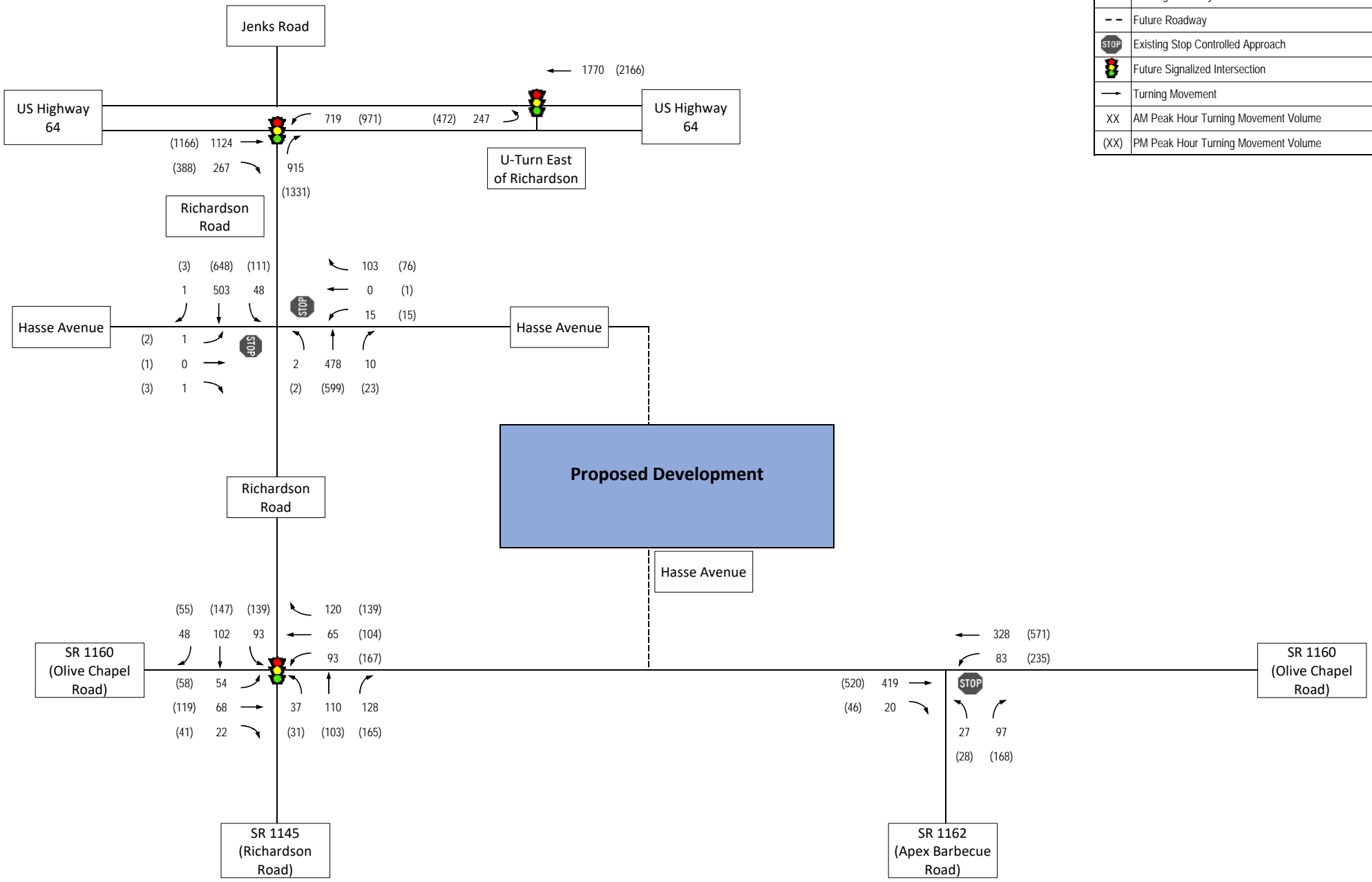


**Figure C-10**  
**Site Trips Due to Linden (Pricewood Assemblage)**

**Hackney Tract Subdivision**  
**Apex, NC**



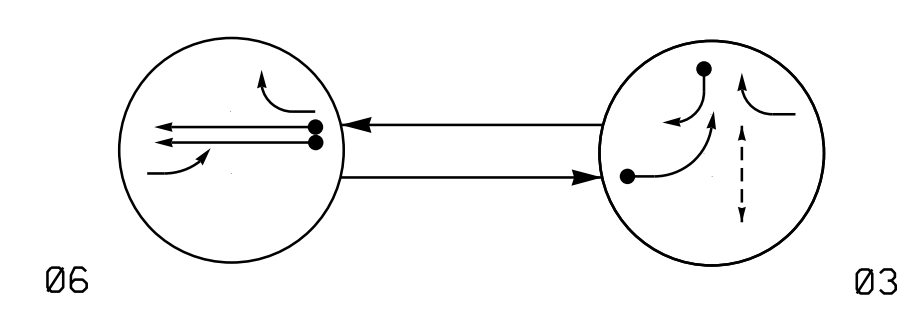
| LEGEND |                                      |
|--------|--------------------------------------|
|        | Existing Roadway                     |
|        | Future Roadway                       |
|        | Existing Stop Controlled Approach    |
|        | Future Signalized Intersection       |
|        | Turning Movement                     |
| XX     | AM Peak Hour Turning Movement Volume |
| (XX)   | PM Peak Hour Turning Movement Volume |



**Figure C-11**  
**Total Site Trips Due to Background Growth and Approved Developments**

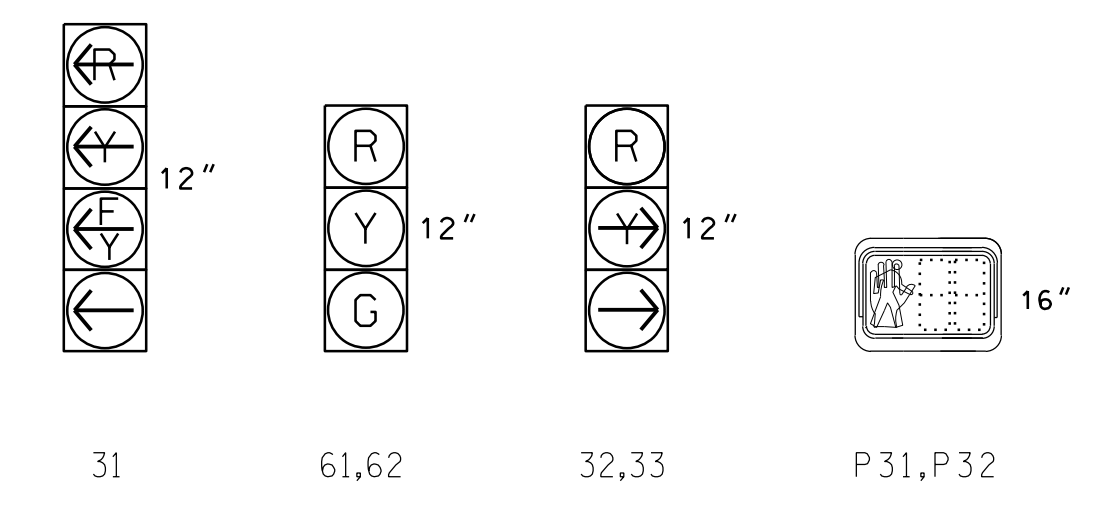
**Hackney Tract Subdivision**  
**Apex, NC**

**DEFAULT PHASING DIAGRAM**



| DEFAULT PHASING TABLE OF OPERATION |       |    |       |
|------------------------------------|-------|----|-------|
| SIGNAL FACE                        | PHASE |    | FLASH |
|                                    | 03    | 06 |       |
| 31                                 | ←     | →  | —     |
| 32,33                              | →     | R  | R     |
| 61,62                              | R     | G  | Y     |
| P31,P32                            | W     | DW | DRK   |

**SIGNAL FACE I.D.**  
All Heads L.E.D.



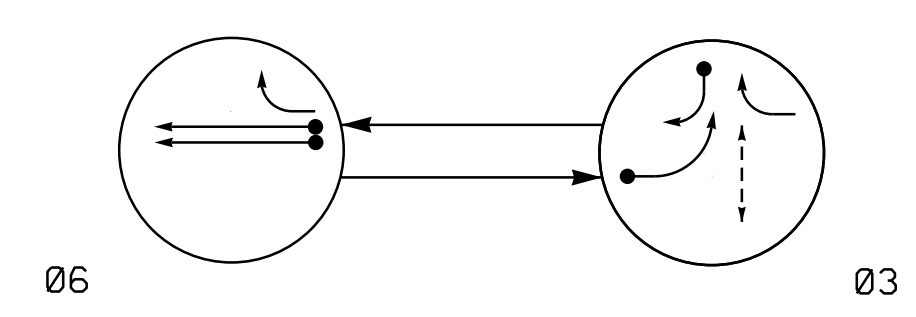
| OASIS 2070 LOOP & DETECTOR INSTALLATION CHART |           |                            |       |          |                      |         |           |              |            |             |          |   |
|---|-----------|----------------------------|-------|----------|----------------------|---------|-----------|--------------|------------|-------------|----------|---|
| LOOP  | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | NEW LOOP | DETECTOR PROGRAMMING |         |           |              |            |             |          |   |
|   |           |                            |       |          | PHASE                | CALLING | EXTENSION | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |   |
| 3A  | 6X40      | 0                          | 2-4-2 | Y        | 3                    | Y       | Y         | -            | -          | 15*         | -        | Y |
| 3B  | 6X40      | 0                          | 2-4-2 | Y        | 3                    | Y       | Y         | -            | -          | 15          | -        | Y |
| 6A  | 6X6       | 420                        | 6     | Y        | 6                    | Y       | Y         | -            | -          | -           | -        | Y |
| 6B  | 6X6       | 420                        | 6     | Y        | 6                    | Y       | Y         | -            | -          | -           | -        | Y |

\* Disable delay during Alternate Phasing operation.

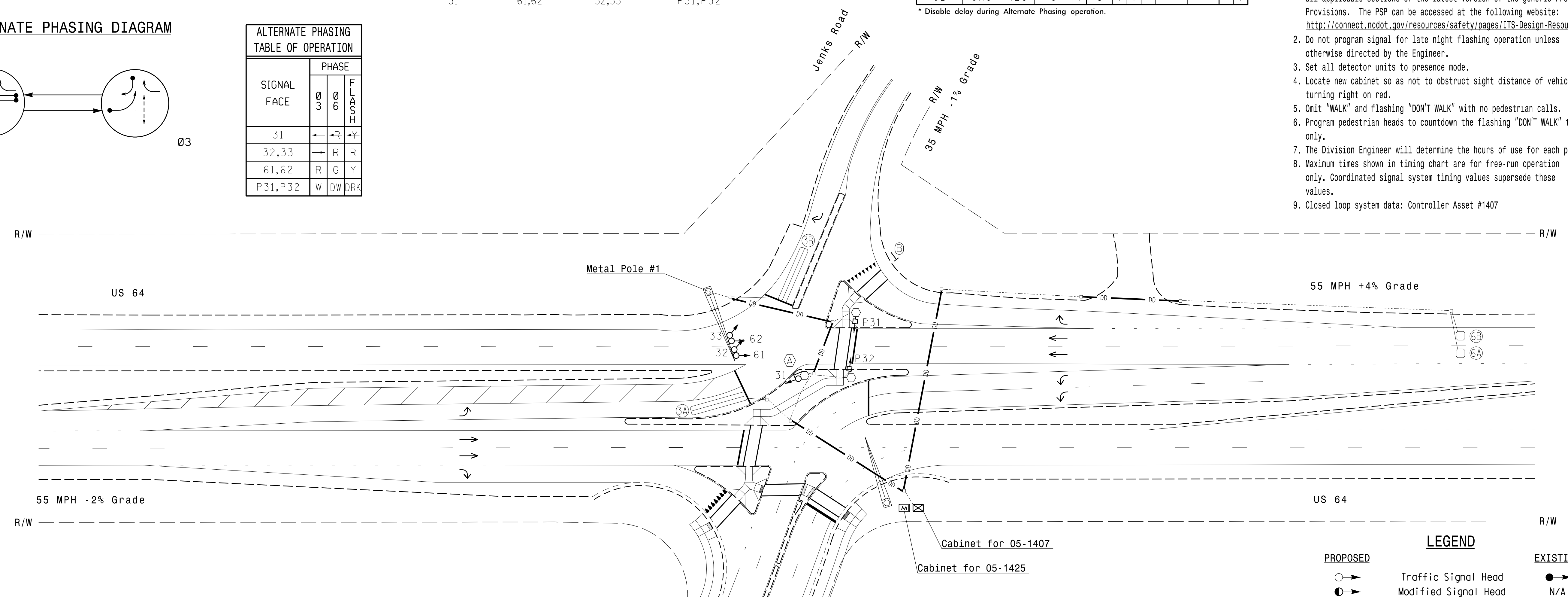
**2 Phase Fully Actuated**  
**(US 64 & Jenks/Richardson Road Closed Loop System)**  
**Signal System: 10534**  
**NOTES**

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx>
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "DON'T WALK" time only.
- The Division Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1407

**ALTERNATE PHASING DIAGRAM**

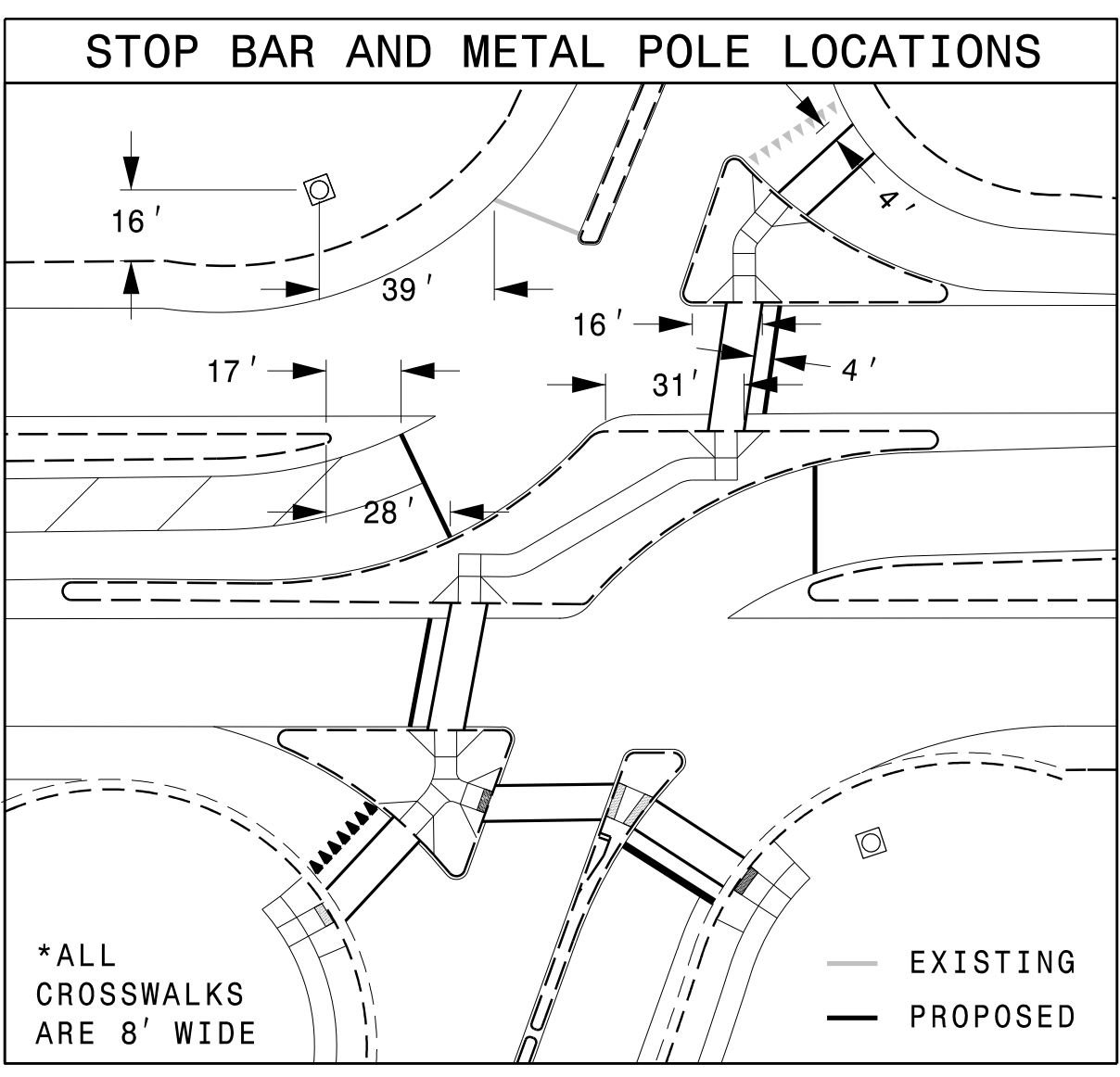


| ALTERNATE PHASING TABLE OF OPERATION |       |    |       |
|--------------------------------------|-------|----|-------|
| SIGNAL FACE                          | PHASE |    | FLASH |
|                                      | 03    | 06 |       |
| 31                                   | ←     | →  | —     |
| 32,33                                | →     | R  | R     |
| 61,62                                | R     | G  | Y     |
| P31,P32                              | W     | DW | DRK   |



| OASIS 2070 TIMING CHART |       |            |
|-------------------------|-------|------------|
| FEATURE                 | PHASE |            |
|                         | 3     | 6          |
| Min Green 1 *           | 7     | 14         |
| Extension 1 *           | 2.0   | 6.0        |
| Max Green 1 *           | 20    | 90         |
| Yellow Clearance        | 3.0   | 4.8        |
| Red Clearance           | 2.6   | 1.4        |
| Walk 1 *                | 7     | -          |
| Don't Walk 1            | 7     | -          |
| Seconds Per Actuation * | -     | 1.5        |
| Max Variable Initial *  | -     | 46         |
| Time Before Reduction * | -     | 15         |
| Time To Reduce *        | -     | 45         |
| Minimum Gap             | -     | 3.4        |
| Recall Mode             | -     | MIN RECALL |
| Vehicle Call Memory     | -     | YELLOW     |
| Dual Entry              | -     | -          |
| Simultaneous Gap        | ON    | ON         |

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



\* ALL CROSSWALKS ARE 8' WIDE

**SIGNS**

- PROPOSED**
- (A) No U-Turn Sign (R3-4)
  - (B) "YIELD" Sign (R1-2)

| PROPOSED | EXISTING |
|----------|----------|
|          |          |
|          |          |
|          |          |
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|          |          |

NC Dept of Transportation  
Division of Highways  
Final Drawing Date: 8/28/2020  
Checked By: [Signature]  
ITS & Signals Unit

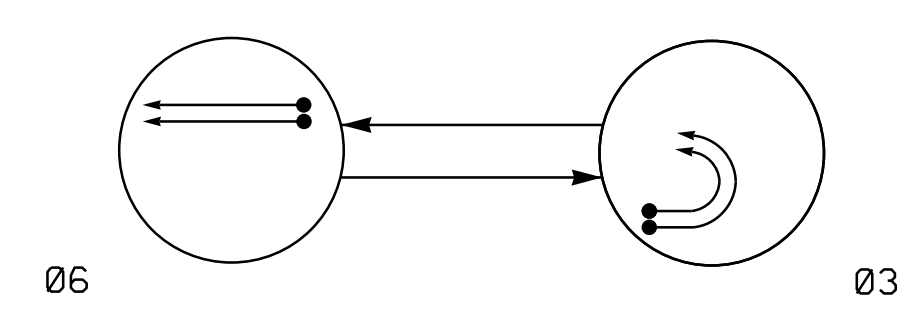
**New Installation**

|  |  |                         |   |
|--|--|-------------------------|---|
| <br>RAMEY KEMP ASSOCIATES<br>8210 University Executive Park Drive Suite 220 Charlotte, North Carolina 28262<br>Phone: 704-549-4200   www.rameykemp.com   NC License No. C-0910 | Prepared For:<br><b>US 64 WB at Jenks Road</b>   |                         | DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED<br>SEAL<br><br>WILLIAM J. HAMILTON<br>PROFESSIONAL ENGINEER<br>No. 32396<br>8/24/2020 |
|  | Division 5 Wake County Apex<br>PLAN DATE: August 2020 REVIEWED BY: WJ Hamilton<br>PREPARED BY: ZM Esposito RKA PROJ. NO: 19331 (040) | REVISIONS<br>INIT. DATE |   |



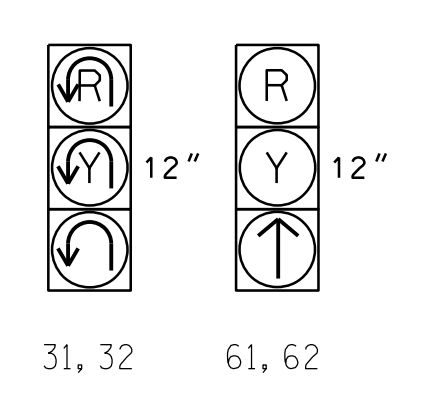


**PHASING DIAGRAM**



| SIGNAL FACE | PHASE |    |       |
|-------------|-------|----|-------|
|             | Ø3    | Ø6 | FLASH |
| 31, 32      | ←     | →  | ↑     |
| 61, 62      | ←     | →  | ↑     |

**SIGNAL FACE I.D.**  
All Heads L.E.D.

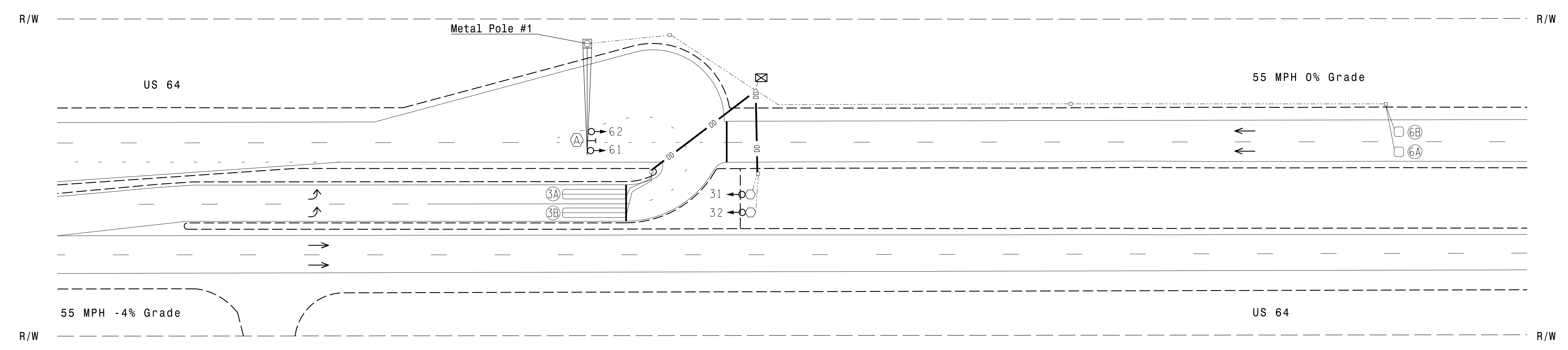


| OASIS 2070 LOOP & DETECTOR INSTALLATION CHART |           |                            |       |                      |       |         |           |                 |              |            |             |          |
|---|-----------|----------------------------|-------|----------------------|-------|---------|-----------|-----------------|--------------|------------|-------------|----------|
| LOOP  | SIZE (FT) | DISTANCE FROM STOPBAR (FT) | TURNS | DETECTOR PROGRAMMING |       |         |           |                 |              |            |             |          |
|   |           |                            |       | NEW LOOP             | PHASE | CALLING | EXTENSION | FULL TIME DELAY | STRETCH TIME | DELAY TIME | SYSTEM LOOP | NEW CARD |
| 3A  | 6X40      | 0                          | 2-4-2 | Y                    | 3     | Y       | Y         | -               | -            | -          | -           | Y        |
| 3B  | 6X40      | 0                          | 2-4-2 | Y                    | 3     | Y       | Y         | -               | -            | -          | -           | Y        |
| 6A  | 6X6       | 420                        | 6     | Y                    | 6     | Y       | Y         | -               | -            | -          | -           | Y        |
| 6B  | 6X6       | 420                        | 6     | Y                    | 6     | Y       | Y         | -               | -            | -          | -           | Y        |

2 Phase Fully Actuated  
(US 64 & Jenks/Richardson Road Closed Loop System)  
Signal System: 10534

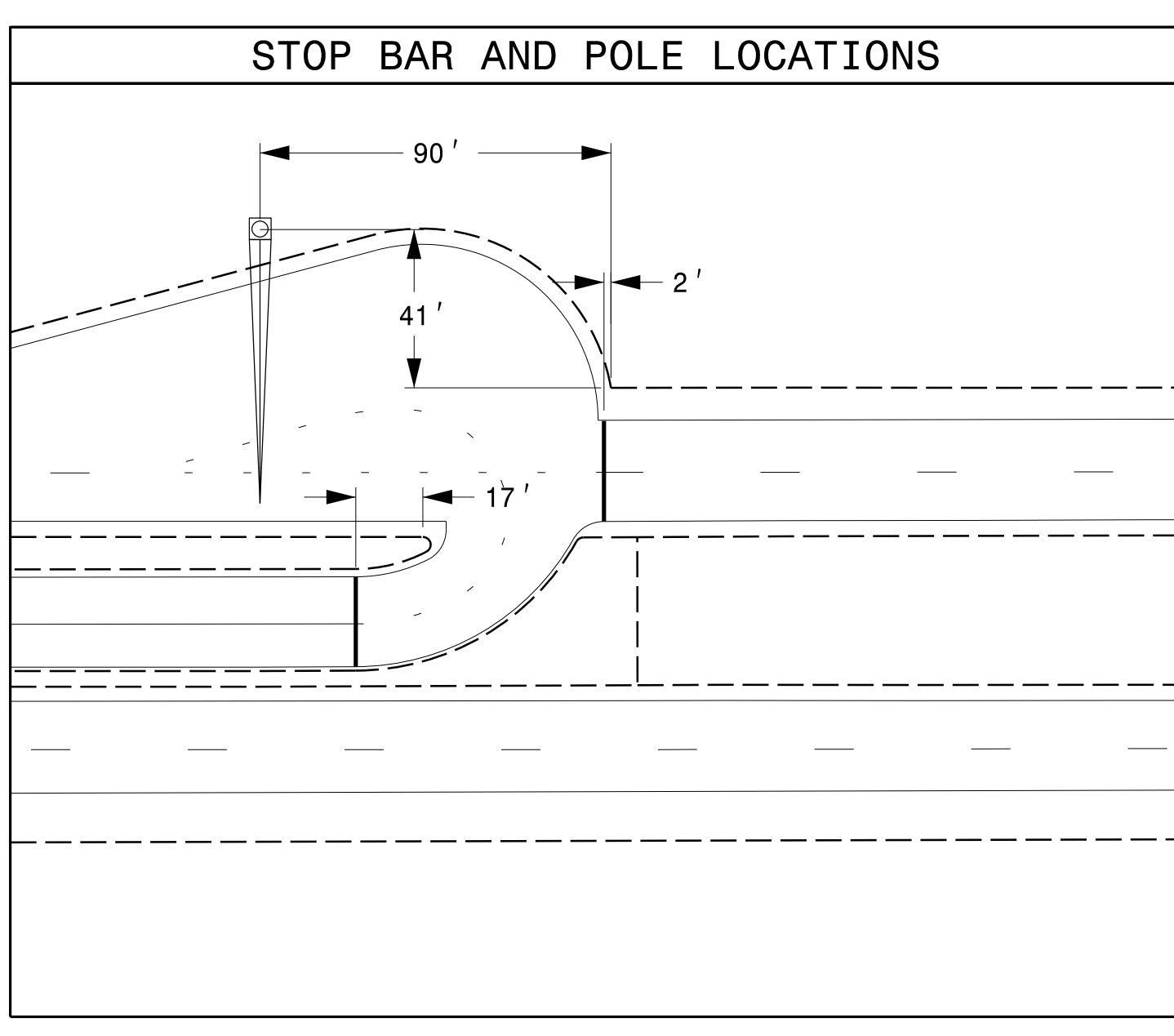
**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx>
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Controller Asset #1426



| FEATURE                 | PHASE |            |
|-------------------------|-------|------------|
|                         | 3     | 6          |
| Min Green 1 *           | 7     | 14         |
| Extension 1 *           | 2.0   | 6.0        |
| Max Green 1 *           | 20    | 90         |
| Yellow Clearance        | 3.0   | 5.2        |
| Red Clearance           | 3.3   | 1.0        |
| Walk 1 *                | -     | -          |
| Don't Walk 1            | -     | -          |
| Seconds Per Actuation * | -     | 1.5        |
| Max Variable Initial *  | -     | 46         |
| Time Before Reduction * | -     | 15         |
| Time To Reduce *        | -     | 45         |
| Minimum Gap             | -     | 3.4        |
| Recall Mode             | -     | MIN RECALL |
| Vehicle Call Memory     | -     | YELLOW     |
| Dual Entry              | -     | -          |
| Simultaneous Gap        | ON    | ON         |

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



NC Dept of Transportation  
Division of Highways  
Final Drawing Date: 8/28/2020  
Checked by: *Changseok Park*  
ITS & Signals Unit

| PROPOSED | LEGEND   | EXISTING |
|----------|--|----------|
|          | Traffic Signal Head                            |          |
|          | Modified Signal Head                           |          |
|          | Sign   |          |
|          | Pedestrian Signal Head With Push Button & Sign |          |
|          | Signal Pole with Guy                           |          |
|          | Signal Pole with Sidewalk Guy                  |          |
|          | Inductive Loop Detector                        |          |
|          | Controller & Cabinet                           |          |
|          | Junction Box                                   |          |
|          | 2-in Underground Conduit                       |          |
|          | Right of Way                                   |          |
|          | Directional Arrow                              |          |
|          | Directional Drill                              |          |
|          | No Left Turn Sign (R3-2)                       |          |
|          | Metal Pole with Mastarm                        |          |
|          | Type II Signal Pedestal                        |          |



New Installation

US 64 WB at U-Turn East of Richardson Road

Division 5 Wake County Apex

PLAN DATE: August 2020 REVIEWED BY: WJ Hamilton

PREPARED BY: ZM Esposito RKA PROJ. NO: 19331 (040)

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1" = 40'

REVISIONS: [Table with columns for REVISIONS, INIT., DATE]

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER, WILLIAM J. HAMILTON, 32396

DATE: 8/24/2020

SIG. INVENTORY NO. 05-1426



## **APPENDIX D:**

# **Intersection Capacity Analysis**



Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

Existing (2020) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 7.9  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      | ↖    | ↗    |      | ↖    | ↗    | ↖    | ↖    | ↗    |      | ↖    | ↗    | ↖    |
| Traffic Vol, veh/h       | 14   | 47   | 15   | 64   | 50   | 19   | 19   | 92   | 71   | 21   | 54   | 16   |
| Future Vol, veh/h        | 14   | 47   | 15   | 64   | 50   | 19   | 19   | 92   | 71   | 21   | 54   | 16   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 250  | -    | -    | 150  | -    | 150  | 100  | -    | -    | 150  | -    | 175  |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 16   | 52   | 17   | 71   | 56   | 21   | 21   | 102  | 79   | 23   | 60   | 18   |

| Major/Minor          | Major1 |   | Major2 |       | Minor1 |   | Minor2 |       |       |       |       |       |
|----------------------|--------|---|--------|-------|--------|---|--------|-------|-------|-------|-------|-------|
| Conflicting Flow All | 77     | 0 | 0      | 69    | 0      | 0 | 341    | 312   | 61    | 381   | 299   | 56    |
| Stage 1              | -      | - | -      | -     | -      | - | 93     | 93    | -     | 198   | 198   | -     |
| Stage 2              | -      | - | -      | -     | -      | - | 248    | 219   | -     | 183   | 101   | -     |
| Critical Hdwy        | 4.12   | - | -      | 4.12  | -      | - | 7.12   | 6.52  | 6.22  | 7.12  | 6.52  | 6.22  |
| Critical Hdwy Stg 1  | -      | - | -      | -     | -      | - | 6.12   | 5.52  | -     | 6.12  | 5.52  | -     |
| Critical Hdwy Stg 2  | -      | - | -      | -     | -      | - | 6.12   | 5.52  | -     | 6.12  | 5.52  | -     |
| Follow-up Hdwy       | 2.218  | - | -      | 2.218 | -      | - | 3.518  | 4.018 | 3.318 | 3.518 | 4.018 | 3.318 |
| Pot Cap-1 Maneuver   | 1522   | - | -      | 1532  | -      | - | 613    | 603   | 1004  | 577   | 613   | 1011  |
| Stage 1              | -      | - | -      | -     | -      | - | 914    | 818   | -     | 804   | 737   | -     |
| Stage 2              | -      | - | -      | -     | -      | - | 756    | 722   | -     | 819   | 811   | -     |
| Platoon blocked, %   | -      | - | -      | -     | -      | - | -      | -     | -     | -     | -     | -     |
| Mov Cap-1 Maneuver   | 1522   | - | -      | 1532  | -      | - | 531    | 569   | 1004  | 439   | 579   | 1011  |
| Mov Cap-2 Maneuver   | -      | - | -      | -     | -      | - | 531    | 569   | -     | 439   | 579   | -     |
| Stage 1              | -      | - | -      | -     | -      | - | 904    | 809   | -     | 795   | 703   | -     |
| Stage 2              | -      | - | -      | -     | -      | - | 648    | 689   | -     | 652   | 802   | -     |

| Approach             | EB  |  | WB  |  | NB   |  | SB   |  |
|----------------------|-----|--|-----|--|------|--|------|--|
| HCM Control Delay, s | 1.4 |  | 3.6 |  | 11.9 |  | 11.7 |  |
| HCM LOS              |     |  |     |  | B    |  | B    |  |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL  | EBT | EBR | WBL   | WBT | WBR | SBLn1 | SBLn2 | SBLn3 |
|-----------------------|-------|-------|------|-----|-----|-------|-----|-----|-------|-------|-------|
| Capacity (veh/h)      | 531   | 701   | 1522 | -   | -   | 1532  | -   | -   | 439   | 579   | 1011  |
| HCM Lane V/C Ratio    | 0.04  | 0.258 | 0.01 | -   | -   | 0.046 | -   | -   | 0.053 | 0.104 | 0.018 |
| HCM Control Delay (s) | 12.1  | 11.9  | 7.4  | -   | -   | 7.5   | -   | -   | 13.7  | 11.9  | 8.6   |
| HCM Lane LOS          | B     | B     | A    | -   | -   | A     | -   | -   | B     | B     | A     |
| HCM 95th %tile Q(veh) | 0.1   | 1     | 0    | -   | -   | 0.1   | -   | -   | 0.2   | 0.3   | 0.1   |

Hackney Tract TIA  
2: Apex Barbecue Rd & Olive Chapel Rd

Existing (2020) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 3.1  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 232  | 18   | 74   | 181  | 24   | 86   |
| Future Vol, veh/h        | 232  | 18   | 74   | 181  | 24   | 86   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 258  | 20   | 82   | 201  | 27   | 96   |

| Major/Minor          | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 278    | 0      | 633    |
| Stage 1              | -      | -      | -      | -      | 268    |
| Stage 2              | -      | -      | -      | -      | 365    |
| Critical Hdwy        | -      | -      | 4.12   | -      | 6.42   |
| Critical Hdwy Stg 1  | -      | -      | -      | -      | 5.42   |
| Critical Hdwy Stg 2  | -      | -      | -      | -      | 5.42   |
| Follow-up Hdwy       | -      | -      | 2.218  | -      | 3.518  |
| Pot Cap-1 Maneuver   | -      | -      | 1285   | -      | 444    |
| Stage 1              | -      | -      | -      | -      | 777    |
| Stage 2              | -      | -      | -      | -      | 702    |
| Platoon blocked, %   | -      | -      | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 1285   | -      | 412    |
| Mov Cap-2 Maneuver   | -      | -      | -      | -      | 412    |
| Stage 1              | -      | -      | -      | -      | 777    |
| Stage 2              | -      | -      | -      | -      | 651    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 2.3 | 11.8 |
| HCM LOS              |    |     | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 648   | -   | -   | 1285  | -   |
| HCM Lane V/C Ratio    | 0.189 | -   | -   | 0.064 | -   |
| HCM Control Delay (s) | 11.8  | -   | -   | 8     | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.7   | -   | -   | 0.2   | -   |

Hackney Tract TIA  
 3: Richardson Rd & Little Gem Ln/Hasse Ave

Existing (2020) AM  
 HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.3  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 1    | 0    | 1    | 13   | 0    | 38   | 2    | 139  | 9    | 25   | 85   | 1    |
| Future Vol, veh/h        | 1    | 0    | 1    | 13   | 0    | 38   | 2    | 139  | 9    | 25   | 85   | 1    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 1    | 0    | 1    | 14   | 0    | 42   | 2    | 154  | 10   | 28   | 94   | 1    |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 335    | 319   | 95     | 314   | 314    | 159   | 95     | 0 | 0 | 164   | 0 | 0 |
| Stage 1              | 151    | 151   | -      | 163   | 163    | -     | -      | - | - | -     | - | - |
| Stage 2              | 184    | 168   | -      | 151   | 151    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 619    | 598   | 962    | 639   | 601    | 886   | 1499   | - | - | 1414  | - | - |
| Stage 1              | 851    | 772   | -      | 839   | 763    | -     | -      | - | - | -     | - | - |
| Stage 2              | 818    | 759   | -      | 851   | 772    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 580    | 585   | 962    | 628   | 588    | 886   | 1499   | - | - | 1414  | - | - |
| Mov Cap-2 Maneuver   | 625    | 606   | -      | 667   | 615    | -     | -      | - | - | -     | - | - |
| Stage 1              | 850    | 757   | -      | 838   | 762    | -     | -      | - | - | -     | - | - |
| Stage 2              | 778    | 758   | -      | 833   | 757    | -     | -      | - | - | -     | - | - |

| Approach             | EB  |  | WB  |  | NB  |  | SB  |  |
|----------------------|-----|--|-----|--|-----|--|-----|--|
| HCM Control Delay, s | 9.8 |  | 9.7 |  | 0.1 |  | 1.7 |  |
| HCM LOS              | A   |  | A   |  |     |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|-------|------|-----|
| Capacity (veh/h)      | 1499  | -   | -   | 758        | 818   | 1414 | -   |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | 0.003      | 0.069 | 0.02 | -   |
| HCM Control Delay (s) | 7.4   | -   | -   | 9.8        | 9.7   | 7.6  | -   |
| HCM Lane LOS          | A     | -   | -   | A          | A     | A    | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0          | 0.2   | 0.1  | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Existing (2020) AM  
HCM 6th TWSC

| Intersection             |      |      |       |      |       |      |      |      |      |      |      |      |
|--------------------------|------|------|-------|------|-------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 10.5 |      |       |      |       |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↑↑   | ↑     |      |       |      |      |      | ↑    |      | ↑    |      |
| Traffic Vol, veh/h       | 0    | 1020 | 21    | 0    | 0     | 0    | 0    | 0    | 244  | 0    | 141  | 0    |
| Future Vol, veh/h        | 0    | 1020 | 21    | 0    | 0     | 0    | 0    | 0    | 244  | 0    | 141  | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0     | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free  | Free | Free  | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | Yield | -    | -     | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 175   | -    | -     | -    | -    | -    | 0    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -     | -    | 16983 | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | -2   | -     | -    | 0     | -    | -    | 1    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90    | 90   | 90    | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2     | 2    | 2     | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0    | 1133 | 23    | 0    | 0     | 0    | 0    | 0    | 271  | 0    | 157  | 0    |

| Major/Minor          | Major1 |   |   | Minor1 |   |      | Minor2 |      |   |
|----------------------|--------|---|---|--------|---|------|--------|------|---|
| Conflicting Flow All | -      | 0 | 0 | -      | - | 567  | 567    | 1133 | - |
| Stage 1              | -      | - | - | -      | - | -    | 0      | 0    | - |
| Stage 2              | -      | - | - | -      | - | -    | 567    | 1133 | - |
| Critical Hdwy        | -      | - | - | -      | - | 7.04 | 7.54   | 6.54 | - |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | -    | -      | -    | - |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | -    | 6.54   | 5.54 | - |
| Follow-up Hdwy       | -      | - | - | -      | - | 3.32 | 3.52   | 4.02 | - |
| Pot Cap-1 Maneuver   | 0      | - | - | 0      | 0 | 459  | 406    | 202  | 0 |
| Stage 1              | 0      | - | - | 0      | 0 | -    | -      | -    | 0 |
| Stage 2              | 0      | - | - | 0      | 0 | -    | 476    | 276  | 0 |
| Platoon blocked, %   | -      | - | - | -      | - | -    | -      | -    | - |
| Mov Cap-1 Maneuver   | -      | - | - | -      | - | 459  | 166    | 202  | - |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | -    | 166    | 202  | - |
| Stage 1              | -      | - | - | -      | - | -    | -      | -    | - |
| Stage 2              | -      | - | - | -      | - | -    | 195    | 276  | - |

| Approach             | EB | NB   | SB |
|----------------------|----|------|----|
| HCM Control Delay, s | 0  | 23.5 | 66 |
| HCM LOS              |    | C    | F  |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | SBLn1 |
|-----------------------|-------|-----|-----|-------|
| Capacity (veh/h)      | 459   | -   | -   | 202   |
| HCM Lane V/C Ratio    | 0.591 | -   | -   | 0.776 |
| HCM Control Delay (s) | 23.5  | -   | -   | 66    |
| HCM Lane LOS          | C     | -   | -   | F     |
| HCM 95th %tile Q(veh) | 3.7   | -   | -   | 5.3   |

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 0.3  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      | ↑↑   | ↗    |      |
| Traffic Vol, veh/h       | 0    | 0    | 0    | 1128 | 24   | 0    |
| Future Vol, veh/h        | 0    | 0    | 0    | 1128 | 24   | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0    | 0    | 0    | 1253 | 27   | 0    |

| Major/Minor          | Major2 | Minor1  |
|----------------------|--------|---------|
| Conflicting Flow All | -      | - 627   |
| Stage 1              | -      | - 0     |
| Stage 2              | -      | - 627   |
| Critical Hdwy        | -      | - 6.84  |
| Critical Hdwy Stg 1  | -      | - -     |
| Critical Hdwy Stg 2  | -      | - 5.84  |
| Follow-up Hdwy       | -      | - 3.52  |
| Pot Cap-1 Maneuver   | 0      | - 416 0 |
| Stage 1              | 0      | - - 0   |
| Stage 2              | 0      | - 495 0 |
| Platoon blocked, %   |        | -       |
| Mov Cap-1 Maneuver   | -      | - 416 - |
| Mov Cap-2 Maneuver   | -      | - 416 - |
| Stage 1              | -      | - - -   |
| Stage 2              | -      | - 495 - |

| Approach             | WB | NB   |
|----------------------|----|------|
| HCM Control Delay, s | 0  | 14.2 |
| HCM LOS              |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | WBT |
|-----------------------|-------|-----|
| Capacity (veh/h)      | 416   | -   |
| HCM Lane V/C Ratio    | 0.064 | -   |
| HCM Control Delay (s) | 14.2  | -   |
| HCM Lane LOS          | B     | -   |
| HCM 95th %tile Q(veh) | 0.2   | -   |



Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

Existing (2020) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 8.3  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      | ↖    | ↗    |      | ↖    | ↗    | ↖    | ↖    | ↗    |      | ↖    | ↗    | ↖    |
| Traffic Vol, veh/h       | 13   | 99   | 21   | 100  | 81   | 39   | 19   | 85   | 115  | 29   | 73   | 8    |
| Future Vol, veh/h        | 13   | 99   | 21   | 100  | 81   | 39   | 19   | 85   | 115  | 29   | 73   | 8    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 250  | -    | -    | 150  | -    | 150  | 100  | -    | -    | 150  | -    | 175  |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 14   | 110  | 23   | 111  | 90   | 43   | 21   | 94   | 128  | 32   | 81   | 9    |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |       |       | Minor2 |       |       |
|----------------------|--------|---|---|--------|---|---|--------|-------|-------|--------|-------|-------|
| Conflicting Flow All | 133    | 0 | 0 | 133    | 0 | 0 | 529    | 505   | 122   | 573    | 473   | 90    |
| Stage 1              | -      | - | - | -      | - | - | 150    | 150   | -     | 312    | 312   | -     |
| Stage 2              | -      | - | - | -      | - | - | 379    | 355   | -     | 261    | 161   | -     |
| Critical Hdwy        | 4.12   | - | - | 4.12   | - | - | 7.12   | 6.52  | 6.22  | 7.12   | 6.52  | 6.22  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.12   | 5.52  | -     | 6.12   | 5.52  | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.12   | 5.52  | -     | 6.12   | 5.52  | -     |
| Follow-up Hdwy       | 2.218  | - | - | 2.218  | - | - | 3.518  | 4.018 | 3.318 | 3.518  | 4.018 | 3.318 |
| Pot Cap-1 Maneuver   | 1452   | - | - | 1452   | - | - | 460    | 470   | 929   | 430    | 490   | 968   |
| Stage 1              | -      | - | - | -      | - | - | 853    | 773   | -     | 699    | 658   | -     |
| Stage 2              | -      | - | - | -      | - | - | 643    | 630   | -     | 744    | 765   | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -      | -     | -     | -      | -     | -     |
| Mov Cap-1 Maneuver   | 1452   | - | - | 1452   | - | - | 368    | 430   | 929   | 289    | 448   | 968   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | 368    | 430   | -     | 289    | 448   | -     |
| Stage 1              | -      | - | - | -      | - | - | 844    | 765   | -     | 692    | 608   | -     |
| Stage 2              | -      | - | - | -      | - | - | 510    | 582   | -     | 557    | 757   | -     |

| Approach             | EB  |  |  | WB  |  |  | NB   |  |  | SB   |  |  |
|----------------------|-----|--|--|-----|--|--|------|--|--|------|--|--|
| HCM Control Delay, s | 0.7 |  |  | 3.5 |  |  | 14.1 |  |  | 15.5 |  |  |
| HCM LOS              |     |  |  |     |  |  | B    |  |  | C    |  |  |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBL  | EBT | EBR | WBL   | WBT | WBR | SBLn1 | SBLn2 | SBLn3 |
|-----------------------|-------|-------|------|-----|-----|-------|-----|-----|-------|-------|-------|
| Capacity (veh/h)      | 368   | 622   | 1452 | -   | -   | 1452  | -   | -   | 289   | 448   | 968   |
| HCM Lane V/C Ratio    | 0.057 | 0.357 | 0.01 | -   | -   | 0.077 | -   | -   | 0.111 | 0.181 | 0.009 |
| HCM Control Delay (s) | 15.4  | 14    | 7.5  | -   | -   | 7.7   | -   | -   | 19    | 14.8  | 8.8   |
| HCM Lane LOS          | C     | B     | A    | -   | -   | A     | -   | -   | C     | B     | A     |
| HCM 95th %tile Q(veh) | 0.2   | 1.6   | 0    | -   | -   | 0.2   | -   | -   | 0.4   | 0.7   | 0     |

Hackney Tract TIA  
2: Apex Barbecue Rd & Olive Chapel Rd

Existing (2020) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 4.8  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 327  | 41   | 209  | 344  | 25   | 149  |
| Future Vol, veh/h        | 327  | 41   | 209  | 344  | 25   | 149  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 363  | 46   | 232  | 382  | 28   | 166  |

| Major/Minor          | Major1 | Major2 | Minor1 |   |             |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 0      | 0      | 409    | 0 | 1232 386    |
| Stage 1              | -      | -      | -      | - | 386 -       |
| Stage 2              | -      | -      | -      | - | 846 -       |
| Critical Hdwy        | -      | -      | 4.12   | - | 6.42 6.22   |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42 -      |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42 -      |
| Follow-up Hdwy       | -      | -      | 2.218  | - | 3.518 3.318 |
| Pot Cap-1 Maneuver   | -      | -      | 1150   | - | 196 662     |
| Stage 1              | -      | -      | -      | - | 687 -       |
| Stage 2              | -      | -      | -      | - | 421 -       |
| Platoon blocked, %   | -      | -      | -      | - | -           |
| Mov Cap-1 Maneuver   | -      | -      | 1150   | - | 146 662     |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 146 -       |
| Stage 1              | -      | -      | -      | - | 687 -       |
| Stage 2              | -      | -      | -      | - | 313 -       |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 3.4 | 19.5 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 439   | -   | -   | 1150  | -   |
| HCM Lane V/C Ratio    | 0.44  | -   | -   | 0.202 | -   |
| HCM Control Delay (s) | 19.5  | -   | -   | 8.9   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.2   | -   | -   | 0.8   | -   |

Hackney Tract TIA  
3: Richardson Rd & Little Gem Ln/Hasse Ave

Existing (2020) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.2  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 2    | 1    | 3    | 13   | 1    | 33   | 2    | 126  | 20   | 38   | 135  | 3    |
| Future Vol, veh/h        | 2    | 1    | 3    | 13   | 1    | 33   | 2    | 126  | 20   | 38   | 135  | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 2    | 1    | 3    | 14   | 1    | 37   | 2    | 140  | 22   | 42   | 150  | 3    |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 410    | 402   | 152    | 393   | 392    | 151   | 153    | 0 | 0 | 162   | 0 | 0 |
| Stage 1              | 236    | 236   | -      | 155   | 155    | -     | -      | - | - | -     | - | - |
| Stage 2              | 174    | 166   | -      | 238   | 237    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 552    | 537   | 894    | 566   | 544    | 895   | 1428   | - | - | 1417  | - | - |
| Stage 1              | 767    | 710   | -      | 847   | 769    | -     | -      | - | - | -     | - | - |
| Stage 2              | 828    | 761   | -      | 765   | 709    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 516    | 520   | 894    | 550   | 527    | 895   | 1428   | - | - | 1417  | - | - |
| Mov Cap-2 Maneuver   | 581    | 558   | -      | 606   | 568    | -     | -      | - | - | -     | - | - |
| Stage 1              | 766    | 689   | -      | 846   | 768    | -     | -      | - | - | -     | - | - |
| Stage 2              | 792    | 760   | -      | 738   | 688    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB  |  | NB  |  | SB  |  |
|----------------------|------|--|-----|--|-----|--|-----|--|
| HCM Control Delay, s | 10.2 |  | 9.9 |  | 0.1 |  | 1.6 |  |
| HCM LOS              | B    |  | A   |  |     |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|-------|------|-----|
| Capacity (veh/h)      | 1428  | -   | -   | 698        | 782   | 1417 | -   |
| HCM Lane V/C Ratio    | 0.002 | -   | -   | 0.01       | 0.067 | 0.03 | -   |
| HCM Control Delay (s) | 7.5   | -   | -   | 10.2       | 9.9   | 7.6  | -   |
| HCM Lane LOS          | A     | -   | -   | B          | A     | A    | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0          | 0.2   | 0.1  | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Existing (2020) PM  
HCM 6th TWSC

| Intersection             |      |      |       |      |       |      |      |      |      |      |      |      |
|--------------------------|------|------|-------|------|-------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 30.2 |      |       |      |       |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR   | WBL  | WBT   | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↑↑   | ↑     |      |       |      |      |      | ↑    |      | ↑    |      |
| Traffic Vol, veh/h       | 0    | 1132 | 30    | 0    | 0     | 0    | 0    | 0    | 203  | 0    | 196  | 0    |
| Future Vol, veh/h        | 0    | 1132 | 30    | 0    | 0     | 0    | 0    | 0    | 203  | 0    | 196  | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0     | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free  | Free | Free  | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | Yield | -    | -     | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 175   | -    | -     | -    | -    | -    | 0    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -     | -    | 16983 | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | -2   | -     | -    | 0     | -    | -    | 1    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90    | 90   | 90    | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2     | 2    | 2     | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0    | 1258 | 33    | 0    | 0     | 0    | 0    | 0    | 226  | 0    | 218  | 0    |

| Major/Minor          | Major1 |   |   | Minor1 |   |      | Minor2 |       |   |
|----------------------|--------|---|---|--------|---|------|--------|-------|---|
| Conflicting Flow All | -      | 0 | 0 | -      | - | 629  | 629    | 1258  | - |
| Stage 1              | -      | - | - | -      | - | -    | 0      | 0     | - |
| Stage 2              | -      | - | - | -      | - | -    | 629    | 1258  | - |
| Critical Hdwy        | -      | - | - | -      | - | 7.04 | 7.54   | 6.54  | - |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | -    | -      | -     | - |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | -    | 6.54   | 5.54  | - |
| Follow-up Hdwy       | -      | - | - | -      | - | 3.32 | 3.52   | 4.02  | - |
| Pot Cap-1 Maneuver   | 0      | - | - | 0      | 0 | 418  | 367    | ~ 170 | 0 |
| Stage 1              | 0      | - | - | 0      | 0 | -    | -      | -     | 0 |
| Stage 2              | 0      | - | - | 0      | 0 | -    | 437    | 241   | 0 |
| Platoon blocked, %   | -      | - | - | -      | - | -    | -      | -     | - |
| Mov Cap-1 Maneuver   | -      | - | - | -      | - | 418  | 169    | ~ 170 | - |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | -    | 169    | ~ 170 | - |
| Stage 1              | -      | - | - | -      | - | -    | -      | -     | - |
| Stage 2              | -      | - | - | -      | - | -    | 201    | 241   | - |

| Approach             | EB | NB   | SB    |
|----------------------|----|------|-------|
| HCM Control Delay, s | 0  | 23.3 | 216.7 |
| HCM LOS              |    | C    | F     |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | SBLn1 |
|-----------------------|-------|-----|-----|-------|
| Capacity (veh/h)      | 418   | -   | -   | 170   |
| HCM Lane V/C Ratio    | 0.54  | -   | -   | 1.281 |
| HCM Control Delay (s) | 23.3  | -   | -   | 216.7 |
| HCM Lane LOS          | C     | -   | -   | F     |
| HCM 95th %tile Q(veh) | 3.1   | -   | -   | 12.5  |

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 0.5  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      | ↑↑   | ↘    |      |
| Traffic Vol, veh/h       | 0    | 0    | 0    | 1463 | 39   | 0    |
| Future Vol, veh/h        | 0    | 0    | 0    | 1463 | 39   | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 0    | 0    | 0    | 1626 | 43   | 0    |

| Major/Minor          | Major2 | Minor1 |
|----------------------|--------|--------|
| Conflicting Flow All | -      | 813    |
| Stage 1              | -      | 0      |
| Stage 2              | -      | 813    |
| Critical Hdwy        | -      | 6.84   |
| Critical Hdwy Stg 1  | -      | -      |
| Critical Hdwy Stg 2  | -      | 5.84   |
| Follow-up Hdwy       | -      | 3.52   |
| Pot Cap-1 Maneuver   | 0      | 316    |
| Stage 1              | 0      | -      |
| Stage 2              | 0      | 396    |
| Platoon blocked, %   | -      | -      |
| Mov Cap-1 Maneuver   | -      | 316    |
| Mov Cap-2 Maneuver   | -      | 316    |
| Stage 1              | -      | -      |
| Stage 2              | -      | 396    |

| Approach             | WB | NB   |
|----------------------|----|------|
| HCM Control Delay, s | 0  | 18.2 |
| HCM LOS              |    | C    |

| Minor Lane/Major Mvmt | NBLn1 | WBT |
|-----------------------|-------|-----|
| Capacity (veh/h)      | 316   | -   |
| HCM Lane V/C Ratio    | 0.137 | -   |
| HCM Control Delay (s) | 18.2  | -   |
| HCM Lane LOS          | C     | -   |
| HCM 95th %tile Q(veh) | 0.5   | -   |



Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

No-Build (2024) AM  
Lanes, Volumes, Timings

| Lane Group              | EBL   | EBT   | EBR  | WBL   | WBT   | WBR   | NBL   | NBT   | NBR  | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Lane Configurations     |       |       |      |       |       |       |       |       |      |       |       |       |
| Traffic Volume (vph)    | 54    | 68    | 22   | 93    | 65    | 120   | 37    | 110   | 128  | 93    | 102   | 48    |
| Future Volume (vph)     | 54    | 68    | 22   | 93    | 65    | 120   | 37    | 110   | 128  | 93    | 102   | 48    |
| Ideal Flow (vphp)       | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Storage Length (ft)     | 250   |       | 0    | 150   |       | 150   | 100   |       | 0    | 150   |       | 175   |
| Storage Lanes           | 1     |       | 0    | 1     |       | 1     | 1     |       | 0    | 1     |       | 1     |
| Taper Length (ft)       | 100   |       |      | 100   |       |       | 100   |       |      | 100   |       |       |
| Lane Util. Factor       | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                     |       | 0.964 |      |       |       | 0.850 |       | 0.919 |      |       |       | 0.850 |
| Flt Protected           | 0.950 |       |      | 0.950 |       |       | 0.950 |       |      | 0.950 |       |       |
| Satd. Flow (prot)       | 1770  | 1796  | 0    | 1770  | 1863  | 1583  | 1770  | 1712  | 0    | 1770  | 1863  | 1583  |
| Flt Permitted           | 0.710 |       |      | 0.692 |       |       | 0.684 |       |      | 0.596 |       |       |
| Satd. Flow (perm)       | 1323  | 1796  | 0    | 1289  | 1863  | 1583  | 1274  | 1712  | 0    | 1110  | 1863  | 1583  |
| Right Turn on Red       |       |       | No   |       |       | No    |       |       | No   |       |       | No    |
| Satd. Flow (RTOR)       |       |       |      |       |       |       |       |       |      |       |       |       |
| Link Speed (mph)        |       | 45    |      |       | 45    |       |       | 45    |      |       | 45    |       |
| Link Distance (ft)      |       | 1889  |      |       | 1311  |       |       | 1771  |      |       | 2925  |       |
| Travel Time (s)         |       | 28.6  |      |       | 19.9  |       |       | 26.8  |      |       | 44.3  |       |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90 | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90 | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 60    | 76    | 24   | 103   | 72    | 133   | 41    | 122   | 142  | 103   | 113   | 53    |
| Shared Lane Traffic (%) |       |       |      |       |       |       |       |       |      |       |       |       |
| Lane Group Flow (vph)   | 60    | 100   | 0    | 103   | 72    | 133   | 41    | 264   | 0    | 103   | 113   | 53    |
| Turn Type               | Perm  | NA    |      | Perm  | NA    | Perm  | Perm  | NA    |      | Perm  | NA    | Perm  |
| Protected Phases        |       | 2     |      |       | 6     |       |       | 4     |      |       | 8     |       |
| Permitted Phases        | 2     |       |      | 6     |       | 6     | 4     |       |      | 8     |       | 8     |
| Detector Phase          | 2     | 2     |      | 6     | 6     | 6     | 4     | 4     |      | 8     | 8     | 8     |
| Switch Phase            |       |       |      |       |       |       |       |       |      |       |       |       |
| Minimum Initial (s)     | 7.0   | 7.0   |      | 7.0   | 7.0   | 7.0   | 7.0   | 7.0   |      | 7.0   | 7.0   | 7.0   |
| Minimum Split (s)       | 14.0  | 14.0  |      | 14.0  | 14.0  | 14.0  | 14.0  | 14.0  |      | 14.0  | 14.0  | 14.0  |
| Total Split (s)         | 26.0  | 26.0  |      | 26.0  | 26.0  | 26.0  | 34.0  | 34.0  |      | 34.0  | 34.0  | 34.0  |
| Total Split (%)         | 43.3% | 43.3% |      | 43.3% | 43.3% | 43.3% | 56.7% | 56.7% |      | 56.7% | 56.7% | 56.7% |
| Maximum Green (s)       | 19.0  | 19.0  |      | 19.0  | 19.0  | 19.0  | 27.0  | 27.0  |      | 27.0  | 27.0  | 27.0  |
| Yellow Time (s)         | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  |      | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |      | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   |
| Lead/Lag                |       |       |      |       |       |       |       |       |      |       |       |       |
| Lead-Lag Optimize?      |       |       |      |       |       |       |       |       |      |       |       |       |
| Vehicle Extension (s)   | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   |
| Recall Mode             | Min   | Min   |      | Min   | Min   | Min   | None  | None  |      | None  | None  | None  |
| Act Effct Green (s)     | 12.1  | 12.1  |      | 12.1  | 12.1  | 12.1  | 12.7  | 12.7  |      | 12.7  | 12.7  | 12.7  |
| Actuated g/C Ratio      | 0.35  | 0.35  |      | 0.35  | 0.35  | 0.35  | 0.36  | 0.36  |      | 0.36  | 0.36  | 0.36  |
| v/c Ratio               | 0.13  | 0.16  |      | 0.23  | 0.11  | 0.24  | 0.09  | 0.43  |      | 0.26  | 0.17  | 0.09  |
| Control Delay           | 9.8   | 9.7   |      | 10.8  | 9.3   | 10.6  | 7.7   | 10.6  |      | 9.4   | 7.9   | 7.5   |
| Queue Delay             | 0.0   | 0.0   |      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |      | 0.0   | 0.0   | 0.0   |
| Total Delay             | 9.8   | 9.7   |      | 10.8  | 9.3   | 10.6  | 7.7   | 10.6  |      | 9.4   | 7.9   | 7.5   |
| LOS                     | A     | A     |      | B     | A     | B     | A     | B     |      | A     | A     | A     |
| Approach Delay          |       | 9.7   |      |       | 10.3  |       |       | 10.2  |      |       | 8.4   |       |
| Approach LOS            |       | A     |      |       | B     |       |       | B     |      |       | A     |       |

Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

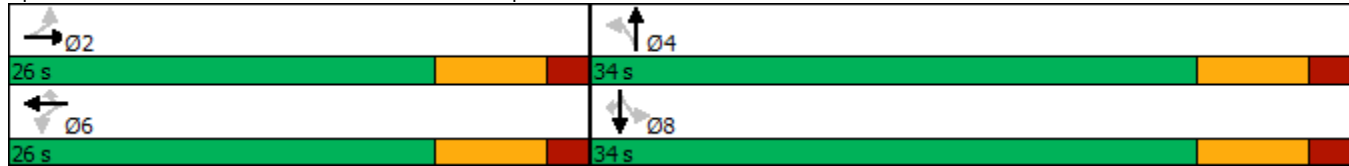
No-Build (2024) AM  
Lanes, Volumes, Timings



| Lane Group              | EBL  | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR | SBL  | SBT  | SBR  |
|-------------------------|------|------|-----|------|------|------|------|------|-----|------|------|------|
| Queue Length 50th (ft)  | 7    | 12   |     | 13   | 8    | 16   | 4    | 31   |     | 11   | 12   | 5    |
| Queue Length 95th (ft)  | 27   | 39   |     | 42   | 30   | 51   | 18   | 82   |     | 38   | 37   | 21   |
| Internal Link Dist (ft) |      | 1809 |     |      | 1231 |      |      | 1691 |     |      | 2845 |      |
| Turn Bay Length (ft)    | 250  |      |     | 150  |      | 150  | 100  |      |     | 150  |      | 175  |
| Base Capacity (vph)     | 805  | 1093 |     | 785  | 1134 | 964  | 1071 | 1440 |     | 933  | 1567 | 1331 |
| Starvation Cap Reductn  | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.07 | 0.09 |     | 0.13 | 0.06 | 0.14 | 0.04 | 0.18 |     | 0.11 | 0.07 | 0.04 |

| Intersection Summary              |                        |
|-----------------------------------|------------------------|
| Area Type:                        | Other                  |
| Cycle Length:                     | 60                     |
| Actuated Cycle Length:            | 35                     |
| Natural Cycle:                    | 40                     |
| Control Type:                     | Actuated-Uncoordinated |
| Maximum v/c Ratio:                | 0.43                   |
| Intersection Signal Delay:        | 9.7                    |
| Intersection Capacity Utilization | 43.8%                  |
| Analysis Period (min)             | 15                     |
| Intersection LOS:                 | A                      |
| ICU Level of Service              | A                      |

Splits and Phases: 1: Richardson Rd & Olive Chapel Rd



Hackney Tract TIA  
 2: Apex Barbecue Rd & Olive Chapel Rd

No-Build (2024) AM  
 HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.9  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 419  | 20   | 83   | 328  | 27   | 97   |
| Future Vol, veh/h        | 419  | 20   | 83   | 328  | 27   | 97   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 466  | 22   | 92   | 364  | 30   | 108  |

| Major/Minor          | Major1 | Major2 | Minor1 |   |       |       |
|----------------------|--------|--------|--------|---|-------|-------|
| Conflicting Flow All | 0      | 0      | 488    | 0 | 1025  | 477   |
| Stage 1              | -      | -      | -      | - | 477   | -     |
| Stage 2              | -      | -      | -      | - | 548   | -     |
| Critical Hdwy        | -      | -      | 4.12   | - | 6.42  | 6.22  |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42  | -     |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42  | -     |
| Follow-up Hdwy       | -      | -      | 2.218  | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver   | -      | -      | 1075   | - | 260   | 588   |
| Stage 1              | -      | -      | -      | - | 624   | -     |
| Stage 2              | -      | -      | -      | - | 579   | -     |
| Platoon blocked, %   | -      | -      | -      | - | -     | -     |
| Mov Cap-1 Maneuver   | -      | -      | 1075   | - | 232   | 588   |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 232   | -     |
| Stage 1              | -      | -      | -      | - | 624   | -     |
| Stage 2              | -      | -      | -      | - | 517   | -     |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 1.7 | 16.8 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 441   | -   | -   | 1075  | -   |
| HCM Lane V/C Ratio    | 0.312 | -   | -   | 0.086 | -   |
| HCM Control Delay (s) | 16.8  | -   | -   | 8.7   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.3   | -   | -   | 0.3   | -   |

Hackney Tract TIA  
3: Richardson Rd & Little Gem Ln/Hasse Ave

No-Build (2024) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 1.9  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 1    | 0    | 1    | 15   | 0    | 103  | 2    | 478  | 10   | 48   | 503  | 1    |
| Future Vol, veh/h        | 1    | 0    | 1    | 15   | 0    | 103  | 2    | 478  | 10   | 48   | 503  | 1    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 1    | 0    | 1    | 17   | 0    | 114  | 2    | 531  | 11   | 53   | 559  | 1    |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 1264   | 1212  | 560    | 1207  | 1207   | 537   | 560    | 0 | 0 | 542   | 0 | 0 |
| Stage 1              | 666    | 666   | -      | 541   | 541    | -     | -      | - | - | -     | - | - |
| Stage 2              | 598    | 546   | -      | 666   | 666    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 146    | 182   | 528    | 160   | 183    | 544   | 1011   | - | - | 1027  | - | - |
| Stage 1              | 449    | 457   | -      | 525   | 521    | -     | -      | - | - | -     | - | - |
| Stage 2              | 489    | 518   | -      | 449   | 457    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 111    | 172   | 528    | 153   | 173    | 544   | 1011   | - | - | 1027  | - | - |
| Mov Cap-2 Maneuver   | 223    | 283   | -      | 282   | 293    | -     | -      | - | - | -     | - | - |
| Stage 1              | 448    | 433   | -      | 524   | 520    | -     | -      | - | - | -     | - | - |
| Stage 2              | 385    | 517   | -      | 425   | 433    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB   |  | NB |  | SB  |  |
|----------------------|------|--|------|--|----|--|-----|--|
| HCM Control Delay, s | 16.5 |  | 15.1 |  | 0  |  | 0.8 |  |
| HCM LOS              | C    |  | C    |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 1011  | -   | -   | 314        | 487   | 1027  | -   |
| HCM Lane V/C Ratio    | 0.002 | -   | -   | 0.007      | 0.269 | 0.052 | -   |
| HCM Control Delay (s) | 8.6   | -   | -   | 16.5       | 15.1  | 8.7   | -   |
| HCM Lane LOS          | A     | -   | -   | C          | C     | A     | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0          | 1.1   | 0.2   | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

No-Build (2024) AM  
Lanes, Volumes, Timings

| Lane Group              | EBL  | EBT   | EBR   | WBL  | WBT  | WBR  | NBL  | NBT  | NBR   | SBL   | SBT   | SBR  |
|-------------------------|------|-------|-------|------|------|------|------|------|-------|-------|-------|------|
| Lane Configurations     |      | ↑↑    | ↗     |      |      |      |      |      | ↖↖    |       | ↖↖    |      |
| Traffic Volume (vph)    | 0    | 1124  | 267   | 0    | 0    | 0    | 0    | 0    | 915   | 0     | 719   | 0    |
| Future Volume (vph)     | 0    | 1124  | 267   | 0    | 0    | 0    | 0    | 0    | 915   | 0     | 719   | 0    |
| Ideal Flow (vphpl)      | 1900 | 1900  | 1900  | 1900 | 1900 | 1900 | 1900 | 1900 | 1900  | 1900  | 1900  | 1900 |
| Grade (%)               |      | -2%   |       |      | 0%   |      |      | 1%   |       |       | 0%    |      |
| Storage Length (ft)     | 0    |       | 175   | 0    |      | 0    | 0    |      | 0     | 0     |       | 0    |
| Storage Lanes           | 0    |       | 1     | 0    |      | 0    | 0    |      | 2     | 0     |       | 0    |
| Taper Length (ft)       | 100  |       |       | 100  |      |      | 100  |      |       | 100   |       |      |
| Lane Util. Factor       | 1.00 | 0.95  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.88  | 0.95  | 0.95  | 1.00 |
| Frt                     |      | 0.850 |       |      |      |      |      |      | 0.850 |       |       |      |
| Flt Protected           |      |       |       |      |      |      |      |      |       |       |       |      |
| Satd. Flow (prot)       | 0    | 3575  | 1599  | 0    | 0    | 0    | 0    | 0    | 2773  | 0     | 3539  | 0    |
| Flt Permitted           |      |       |       |      |      |      |      |      |       |       |       |      |
| Satd. Flow (perm)       | 0    | 3575  | 1599  | 0    | 0    | 0    | 0    | 0    | 2773  | 0     | 3539  | 0    |
| Right Turn on Red       |      |       | No    |      |      | No   |      |      | No    | No    |       | No   |
| Satd. Flow (RTOR)       |      |       |       |      |      |      |      |      |       |       |       |      |
| Link Speed (mph)        |      | 55    |       |      | 55   |      |      | 45   |       |       | 35    |      |
| Link Distance (ft)      |      | 3066  |       |      | 489  |      |      | 978  |       |       | 454   |      |
| Travel Time (s)         |      | 38.0  |       |      | 6.1  |      |      | 14.8 |       |       | 8.8   |      |
| Peak Hour Factor        | 0.90 | 0.90  | 0.90  | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)         | 0    | 1249  | 297   | 0    | 0    | 0    | 0    | 0    | 1017  | 0     | 799   | 0    |
| Shared Lane Traffic (%) |      |       |       |      |      |      |      |      |       |       |       |      |
| Lane Group Flow (vph)   | 0    | 1249  | 297   | 0    | 0    | 0    | 0    | 0    | 1017  | 0     | 799   | 0    |
| Turn Type               |      | NA    | Perm  |      |      |      |      |      | Perm  |       | NA    |      |
| Protected Phases        |      | 2     |       |      |      |      |      |      |       |       | 8     |      |
| Permitted Phases        |      |       | 2     |      |      |      |      |      | 8     | 8     |       |      |
| Detector Phase          |      | 2     | 2     |      |      |      |      |      | 8     | 8     | 8     |      |
| Switch Phase            |      |       |       |      |      |      |      |      |       |       |       |      |
| Minimum Initial (s)     |      | 14.0  | 14.0  |      |      |      |      |      | 7.0   | 7.0   | 7.0   |      |
| Minimum Split (s)       |      | 20.8  | 20.8  |      |      |      |      |      | 13.2  | 13.2  | 13.2  |      |
| Total Split (s)         |      | 30.0  | 30.0  |      |      |      |      |      | 30.0  | 30.0  | 30.0  |      |
| Total Split (%)         |      | 50.0% | 50.0% |      |      |      |      |      | 50.0% | 50.0% | 50.0% |      |
| Maximum Green (s)       |      | 23.2  | 23.2  |      |      |      |      |      | 23.8  | 23.8  | 23.8  |      |
| Yellow Time (s)         |      | 5.4   | 5.4   |      |      |      |      |      | 3.0   | 3.0   | 3.0   |      |
| All-Red Time (s)        |      | 1.4   | 1.4   |      |      |      |      |      | 3.2   | 3.2   | 3.2   |      |
| Lost Time Adjust (s)    |      | -1.8  | -1.8  |      |      |      |      |      | -1.2  |       | -1.2  |      |
| Total Lost Time (s)     |      | 5.0   | 5.0   |      |      |      |      |      | 5.0   |       | 5.0   |      |
| Lead/Lag                |      |       |       |      |      |      |      |      |       |       |       |      |
| Lead-Lag Optimize?      |      |       |       |      |      |      |      |      |       |       |       |      |
| Vehicle Extension (s)   |      | 6.0   | 6.0   |      |      |      |      |      | 2.0   | 2.0   | 2.0   |      |
| Minimum Gap (s)         |      | 3.4   | 3.4   |      |      |      |      |      | 0.2   | 0.2   | 0.2   |      |
| Time Before Reduce (s)  |      | 15.0  | 15.0  |      |      |      |      |      | 0.0   | 0.0   | 0.0   |      |
| Time To Reduce (s)      |      | 45.0  | 45.0  |      |      |      |      |      | 0.0   | 0.0   | 0.0   |      |
| Recall Mode             |      | C-Min | C-Min |      |      |      |      |      | None  | None  | None  |      |
| Act Effect Green (s)    |      | 25.2  | 25.2  |      |      |      |      |      | 24.8  |       | 24.8  |      |
| Actuated g/C Ratio      |      | 0.42  | 0.42  |      |      |      |      |      | 0.41  |       | 0.41  |      |
| v/c Ratio               |      | 0.83  | 0.44  |      |      |      |      |      | 0.89  |       | 0.55  |      |
| Control Delay           |      | 22.1  | 15.1  |      |      |      |      |      | 28.2  |       | 10.9  |      |
| Queue Delay             |      | 0.0   | 0.0   |      |      |      |      |      | 0.0   |       | 0.0   |      |



Hackney Tract TIA  
4: Richardson Rd & US 64 EB

No-Build (2024) AM  
Lanes, Volumes, Timings

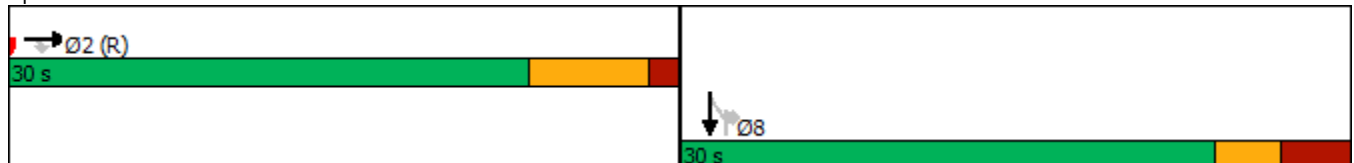


| Lane Group              | EBL | EBT  | EBR  | WBL | WBT | WBR | NBL | NBT  | NBR  | SBL | SBT  | SBR |
|-------------------------|-----|------|------|-----|-----|-----|-----|------|------|-----|------|-----|
| Total Delay             |     | 22.1 | 15.1 |     |     |     |     |      | 28.2 |     | 10.9 |     |
| LOS                     |     | C    | B    |     |     |     |     |      | C    |     | B    |     |
| Approach Delay          |     | 20.7 |      |     |     |     |     | 28.2 |      |     | 10.9 |     |
| Approach LOS            |     | C    |      |     |     |     |     | C    |      |     | B    |     |
| Queue Length 50th (ft)  |     | 203  | 74   |     |     |     |     |      | 183  |     | 106  |     |
| Queue Length 95th (ft)  |     | #296 | 132  |     |     |     |     |      | #311 |     | m120 |     |
| Internal Link Dist (ft) |     | 2986 |      |     | 409 |     |     | 898  |      |     | 374  |     |
| Turn Bay Length (ft)    |     |      | 175  |     |     |     |     |      |      |     |      |     |
| Base Capacity (vph)     |     | 1502 | 672  |     |     |     |     |      | 1155 |     | 1474 |     |
| Starvation Cap Reductn  |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Spillback Cap Reductn   |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Storage Cap Reductn     |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Reduced v/c Ratio       |     | 0.83 | 0.44 |     |     |     |     |      | 0.88 |     | 0.54 |     |

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 60  
 Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 20.7  
 Intersection LOS: C  
 Intersection Capacity Utilization 99.9%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Richardson Rd & US 64 EB



Hackney Tract TIA  
5: U-Turn East & US 64 WB

No-Build (2024) AM  
Lanes, Volumes, Timings



| Lane Group              | EBT  | EBR  | WBL  | WBT   | NBL   | NBR  |
|-------------------------|------|------|------|-------|-------|------|
| Lane Configurations     |      |      |      | ↑↑    | ↑↑    |      |
| Traffic Volume (vph)    | 0    | 0    | 0    | 1770  | 247   | 0    |
| Future Volume (vph)     | 0    | 0    | 0    | 1770  | 247   | 0    |
| Ideal Flow (vphpl)      | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Lane Util. Factor       | 1.00 | 1.00 | 1.00 | 0.95  | 0.97  | 1.00 |
| Frt                     |      |      |      |       |       |      |
| Flt Protected           |      |      |      |       | 0.950 |      |
| Satd. Flow (prot)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Flt Permitted           |      |      |      |       | 0.950 |      |
| Satd. Flow (perm)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Right Turn on Red       |      | No   |      |       | No    | No   |
| Satd. Flow (RTOR)       |      |      |      |       |       |      |
| Link Speed (mph)        | 55   |      |      | 55    | 25    |      |
| Link Distance (ft)      | 459  |      |      | 2512  | 426   |      |
| Travel Time (s)         | 5.7  |      |      | 31.1  | 11.6  |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)         | 0    | 0    | 0    | 1967  | 274   | 0    |
| Shared Lane Traffic (%) |      |      |      |       |       |      |
| Lane Group Flow (vph)   | 0    | 0    | 0    | 1967  | 274   | 0    |
| Turn Type               |      |      |      | NA    | Prot  |      |
| Protected Phases        |      |      |      | 6     | 8     |      |
| Permitted Phases        |      |      |      |       |       |      |
| Detector Phase          |      |      |      | 6     | 8     |      |
| Switch Phase            |      |      |      |       |       |      |
| Minimum Initial (s)     |      |      |      | 14.0  | 7.0   |      |
| Minimum Split (s)       |      |      |      | 20.2  | 13.3  |      |
| Total Split (s)         |      |      |      | 46.7  | 13.3  |      |
| Total Split (%)         |      |      |      | 77.8% | 22.2% |      |
| Maximum Green (s)       |      |      |      | 40.5  | 7.0   |      |
| Yellow Time (s)         |      |      |      | 5.2   | 3.0   |      |
| All-Red Time (s)        |      |      |      | 1.0   | 3.3   |      |
| Lost Time Adjust (s)    |      |      |      | -1.2  | -1.3  |      |
| Total Lost Time (s)     |      |      |      | 5.0   | 5.0   |      |
| Lead/Lag                |      |      |      |       |       |      |
| Lead-Lag Optimize?      |      |      |      |       |       |      |
| Vehicle Extension (s)   |      |      |      | 6.0   | 2.0   |      |
| Minimum Gap (s)         |      |      |      | 3.4   | 0.2   |      |
| Time Before Reduce (s)  |      |      |      | 15.0  | 0.0   |      |
| Time To Reduce (s)      |      |      |      | 45.0  | 0.0   |      |
| Recall Mode             |      |      |      | C-Min | None  |      |
| Act Effct Green (s)     |      |      |      | 41.7  | 8.3   |      |
| Actuated g/C Ratio      |      |      |      | 0.70  | 0.14  |      |
| v/c Ratio               |      |      |      | 0.80  | 0.58  |      |
| Control Delay           |      |      |      | 9.6   | 27.8  |      |
| Queue Delay             |      |      |      | 0.0   | 0.0   |      |
| Total Delay             |      |      |      | 9.6   | 27.8  |      |
| LOS                     |      |      |      | A     | C     |      |
| Approach Delay          |      |      |      | 9.6   | 27.8  |      |
| Approach LOS            |      |      |      | A     | C     |      |



| Lane Group              | EBT | EBR | WBL | WBT  | NBL  | NBR |
|-------------------------|-----|-----|-----|------|------|-----|
| Queue Length 50th (ft)  |     |     |     | 199  | 50   |     |
| Queue Length 95th (ft)  |     |     |     | 288  | m60  |     |
| Internal Link Dist (ft) | 379 |     |     | 2432 | 346  |     |
| Turn Bay Length (ft)    |     |     |     |      |      |     |
| Base Capacity (vph)     |     |     |     | 2459 | 474  |     |
| Starvation Cap Reductn  |     |     |     | 0    | 0    |     |
| Spillback Cap Reductn   |     |     |     | 0    | 0    |     |
| Storage Cap Reductn     |     |     |     | 0    | 0    |     |
| Reduced v/c Ratio       |     |     |     | 0.80 | 0.58 |     |

Intersection Summary























|   |   |
|---|---|
| Area Type:  | Other   |
| Cycle Length:   | 60  |
| Actuated Cycle Length:  | 60  |
| Offset:   | 0 (0%), Referenced to phase 6:WBT, Start of Green |
| Natural Cycle:  | 60  |
| Control Type:   | Actuated-Coordinated                              |
| Maximum v/c Ratio:  | 0.80  |
| Intersection Signal Delay:  | 11.8  |
| Intersection LOS:   | B   |
| Intersection Capacity Utilization                                 | 64.3%   |
| ICU Level of Service  | C   |
| Analysis Period (min)   | 15  |
| m Volume for 95th percentile queue is metered by upstream signal. |   |

Splits and Phases: 5: U-Turn East & US 64 WB



Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

No-Build (2024) PM  
Lanes, Volumes, Timings

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |  |  |   |  |  |  |  |  |   |  |  |  |
| Traffic Volume (vph)    | 58  | 119   | 41  | 167   | 104   | 139   | 31   | 103   | 165   | 139   | 147   | 55  |
| Future Volume (vph)     | 58  | 119   | 41  | 167   | 104   | 139   | 31   | 103   | 165   | 139   | 147   | 55  |
| Ideal Flow (vphp)       | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Storage Length (ft)     | 250   |   | 0   | 150   |   | 150   | 100  |   | 0   | 150   |   | 175   |
| Storage Lanes           | 1   |   | 0   | 1   |   | 1   | 1  |   | 0   | 1   |   | 1   |
| Taper Length (ft)       | 100   |   |   | 100   |   |   | 100  |   |   | 100   |   |   |
| Lane Util. Factor       | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                     |   | 0.961   |   |   |   | 0.850   |  | 0.908   |   |   |   | 0.850   |
| Flt Protected           | 0.950   |   |   | 0.950   |   |   | 0.950  |   |   | 0.950   |   |   |
| Satd. Flow (prot)       | 1770  | 1790  | 0   | 1770  | 1863  | 1583  | 1770   | 1691  | 0   | 1770  | 1863  | 1583  |
| Flt Permitted           | 0.682   |   |   | 0.645   |   |   | 0.654  |   |   | 0.579   |   |   |
| Satd. Flow (perm)       | 1270  | 1790  | 0   | 1201  | 1863  | 1583  | 1218   | 1691  | 0   | 1079  | 1863  | 1583  |
| Right Turn on Red       |   |   | No  |   |   | No  |  |   | No  |   |   | No  |
| Satd. Flow (RTOR)       |   |   |   |   |   |   |  |   |   |   |   |   |
| Link Speed (mph)        |   | 45  |   |   | 45  |   |  | 45  |   |   | 45  |   |
| Link Distance (ft)      |   | 1889  |   |   | 1311  |   |  | 1771  |   |   | 2925  |   |
| Travel Time (s)         |   | 28.6  |   |   | 19.9  |   |  | 26.8  |   |   | 44.3  |   |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 64  | 132   | 46  | 186   | 116   | 154   | 34   | 114   | 183   | 154   | 163   | 61  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 64  | 178   | 0   | 186   | 116   | 154   | 34   | 297   | 0   | 154   | 163   | 61  |
| Turn Type               | Perm  | NA  |   | Perm  | NA  | Perm  | Perm   | NA  |   | Perm  | NA  | Perm  |
| Protected Phases        |   | 2   |   |   | 6   |   |  | 4   |   |   |   | 8   |
| Permitted Phases        | 2   |   |   | 6   |   | 6   | 4  |   |   | 8   |   | 8   |
| Detector Phase          | 2   | 2   |   | 6   | 6   | 6   | 4  | 4   |   | 8   | 8   | 8   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     | 7.0   | 7.0   |   | 7.0   | 7.0   | 7.0   | 7.0  | 7.0   |   | 7.0   | 7.0   | 7.0   |
| Minimum Split (s)       | 14.0  | 14.0  |   | 14.0  | 14.0  | 14.0  | 14.0   | 14.0  |   | 14.0  | 14.0  | 14.0  |
| Total Split (s)         | 29.0  | 29.0  |   | 29.0  | 29.0  | 29.0  | 31.0   | 31.0  |   | 31.0  | 31.0  | 31.0  |
| Total Split (%)         | 48.3%   | 48.3%   |   | 48.3%   | 48.3%   | 48.3%   | 51.7%  | 51.7%   |   | 51.7%   | 51.7%   | 51.7%   |
| Maximum Green (s)       | 22.0  | 22.0  |   | 22.0  | 22.0  | 22.0  | 24.0   | 24.0  |   | 24.0  | 24.0  | 24.0  |
| Yellow Time (s)         | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   | 5.0  | 5.0   |   | 5.0   | 5.0   | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0   |   | 2.0   | 2.0   | 2.0   | 2.0  | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  |   | -2.0  | -2.0  | -2.0  | -2.0   | -2.0  |   | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   | 5.0  | 5.0   |   | 5.0   | 5.0   | 5.0   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Vehicle Extension (s)   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   |   | 3.0   | 3.0   | 3.0   |
| Recall Mode             | Min   | Min   |   | Min   | Min   | Min   | None   | None  |   | None  | None  | None  |
| Act Effct Green (s)     | 14.2  | 14.2  |   | 14.2  | 14.2  | 14.2  | 14.6   | 14.6  |   | 14.6  | 14.6  | 14.6  |
| Actuated g/C Ratio      | 0.36  | 0.36  |   | 0.36  | 0.36  | 0.36  | 0.37   | 0.37  |   | 0.37  | 0.37  | 0.37  |
| v/c Ratio               | 0.14  | 0.28  |   | 0.43  | 0.17  | 0.27  | 0.08   | 0.47  |   | 0.39  | 0.24  | 0.10  |
| Control Delay           | 10.2  | 10.9  |   | 13.9  | 10.0  | 11.1  | 9.6  | 13.1  |   | 13.4  | 10.4  | 9.6   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 10.2  | 10.9  |   | 13.9  | 10.0  | 11.1  | 9.6  | 13.1  |   | 13.4  | 10.4  | 9.6   |
| LOS                     | B   | B   |   | B   | B   | B   | A  | B   |   | B   | B   | A   |
| Approach Delay          |   | 10.7  |   |   | 12.0  |   |  | 12.7  |   |   | 11.5  |   |
| Approach LOS            |   | B   |   |   | B   |   |  | B   |   |   | B   |   |

Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

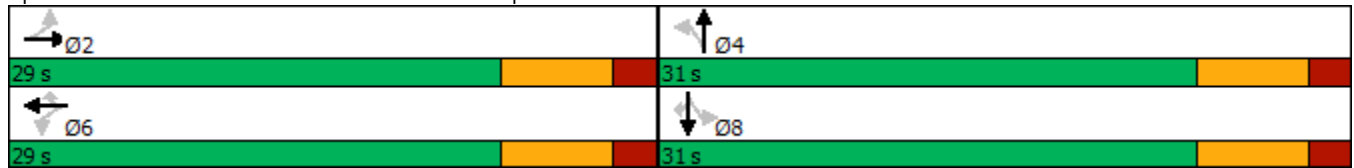
No-Build (2024) PM  
Lanes, Volumes, Timings



| Lane Group              | EBL  | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR | SBL  | SBT  | SBR  |
|-------------------------|------|------|-----|------|------|------|------|------|-----|------|------|------|
| Queue Length 50th (ft)  | 8    | 24   |     | 27   | 15   | 21   | 4    | 43   |     | 21   | 21   | 8    |
| Queue Length 95th (ft)  | 33   | 73   |     | 86   | 50   | 66   | 21   | 124  |     | 73   | 67   | 31   |
| Internal Link Dist (ft) |      | 1809 |     |      | 1231 |      |      | 1691 |     |      | 2845 |      |
| Turn Bay Length (ft)    | 250  |      |     | 150  |      | 150  | 100  |      |     | 150  |      | 175  |
| Base Capacity (vph)     | 817  | 1152 |     | 773  | 1199 | 1018 | 849  | 1179 |     | 752  | 1299 | 1103 |
| Starvation Cap Reductn  | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.08 | 0.15 |     | 0.24 | 0.10 | 0.15 | 0.04 | 0.25 |     | 0.20 | 0.13 | 0.06 |

| Intersection Summary              |                        |
|-----------------------------------|------------------------|
| Area Type:                        | Other                  |
| Cycle Length:                     | 60                     |
| Actuated Cycle Length:            | 39.4                   |
| Natural Cycle:                    | 40                     |
| Control Type:                     | Actuated-Uncoordinated |
| Maximum v/c Ratio:                | 0.47                   |
| Intersection Signal Delay:        | 11.8                   |
| Intersection LOS:                 | B                      |
| Intersection Capacity Utilization | 57.9%                  |
| ICU Level of Service              | B                      |
| Analysis Period (min)             | 15                     |

Splits and Phases: 1: Richardson Rd & Olive Chapel Rd





Hackney Tract TIA  
2: Apex Barbecue Rd & Olive Chapel Rd

No-Build (2024) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 13.1 |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      | T    |      | T    |      | T    |      |
| Traffic Vol, veh/h       | 520  | 46   | 235  | 571  | 28   | 168  |
| Future Vol, veh/h        | 520  | 46   | 235  | 571  | 28   | 168  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 578  | 51   | 261  | 634  | 31   | 187  |

| Major/Minor          | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 629    | 0      | 1760   |
| Stage 1              | -      | -      | -      | -      | 604    |
| Stage 2              | -      | -      | -      | -      | 1156   |
| Critical Hdwy        | -      | -      | 4.12   | -      | 6.42   |
| Critical Hdwy Stg 1  | -      | -      | -      | -      | 5.42   |
| Critical Hdwy Stg 2  | -      | -      | -      | -      | 5.42   |
| Follow-up Hdwy       | -      | -      | 2.218  | -      | 3.518  |
| Pot Cap-1 Maneuver   | -      | -      | 953    | -      | 93     |
| Stage 1              | -      | -      | -      | -      | 546    |
| Stage 2              | -      | -      | -      | -      | 300    |
| Platoon blocked, %   | -      | -      | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 953    | -      | 54     |
| Mov Cap-2 Maneuver   | -      | -      | -      | -      | 54     |
| Stage 1              | -      | -      | -      | -      | 546    |
| Stage 2              | -      | -      | -      | -      | 173    |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 3  | 92.5 |
| HCM LOS              |    |    | F    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 229   | -   | -   | 953   | -   |
| HCM Lane V/C Ratio    | 0.951 | -   | -   | 0.274 | -   |
| HCM Control Delay (s) | 92.5  | -   | -   | 10.2  | 0   |
| HCM Lane LOS          | F     | -   | -   | B     | A   |
| HCM 95th %tile Q(veh) | 8.4   | -   | -   | 1.1   | -   |

Hackney Tract TIA  
3: Richardson Rd & Little Gem Ln/Hasse Ave

No-Build (2024) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 2    | 1    | 3    | 15   | 1    | 76   | 2    | 599  | 23   | 111  | 648  | 3    |
| Future Vol, veh/h        | 2    | 1    | 3    | 15   | 1    | 76   | 2    | 599  | 23   | 111  | 648  | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 2    | 1    | 3    | 17   | 1    | 84   | 2    | 666  | 26   | 123  | 720  | 3    |













| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 1694   | 1664  | 722    | 1653  | 1652   | 679   | 723    | 0 | 0 | 692   | 0 | 0 |
| Stage 1              | 968    | 968   | -      | 683   | 683    | -     | -      | - | - | -     | - | - |
| Stage 2              | 726    | 696   | -      | 970   | 969    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 73     | 97    | 427    | 78    | 98     | 452   | 879    | - | - | 903   | - | - |
| Stage 1              | 305    | 332   | -      | 439   | 449    | -     | -      | - | - | -     | - | - |
| Stage 2              | 416    | 443   | -      | 304   | 332    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 53     | 84    | 427    | 69    | 84     | 452   | 879    | - | - | 903   | - | - |
| Mov Cap-2 Maneuver   | 138    | 176   | -      | 177   | 195    | -     | -      | - | - | -     | - | - |
| Stage 1              | 304    | 287   | -      | 438   | 448    | -     | -      | - | - | -     | - | - |
| Stage 2              | 337    | 442   | -      | 260   | 287    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB   |  | NB |  | SB  |  |
|----------------------|------|--|------|--|----|--|-----|--|
| HCM Control Delay, s | 21.8 |  | 19.1 |  | 0  |  | 1.4 |  |
| HCM LOS              | C    |  | C    |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 879   | -   | -   | 221        | 357   | 903   | -   |
| HCM Lane V/C Ratio    | 0.003 | -   | -   | 0.03       | 0.286 | 0.137 | -   |
| HCM Control Delay (s) | 9.1   | -   | -   | 21.8       | 19.1  | 9.6   | -   |
| HCM Lane LOS          | A     | -   | -   | C          | C     | A     | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0.1        | 1.2   | 0.5   | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

No-Build (2024) PM  
Lanes, Volumes, Timings

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |   | ↑↑  | ↗   |   |   |   |  |   | ↖↖  |   | ↖↖  |   |
| Traffic Volume (vph)    | 0   | 1166  | 388   | 0   | 0   | 0   | 0  | 0   | 1331  | 0   | 971   | 0   |
| Future Volume (vph)     | 0   | 1166  | 388   | 0   | 0   | 0   | 0  | 0   | 1331  | 0   | 971   | 0   |
| Ideal Flow (vphpl)      | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)               |   | -2%   |   |   | 0%  |   |  | 1%  |   |   | 0%  |   |
| Storage Length (ft)     | 0   |   | 175   | 0   |   | 0   | 0  |   | 0   | 0   |   | 0   |
| Storage Lanes           | 0   |   | 1   | 0   |   | 0   | 0  |   | 2   | 0   |   | 0   |
| Taper Length (ft)       | 100   |   |   | 100   |   |   | 100  |   |   | 100   |   |   |
| Lane Util. Factor       | 1.00  | 0.95  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Frt                     |   | 0.850   |   |   |   |   |  |   | 0.850   |   |   |   |
| Flt Protected           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (prot)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Flt Permitted           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (perm)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Right Turn on Red       |   |   | No  |   |   | No  |  |   | No  | No  |   | No  |
| Satd. Flow (RTOR)       |   |   |   |   |   |   |  |   |   |   |   |   |
| Link Speed (mph)        |   | 55  |   |   | 55  |   |  | 45  |   |   | 35  |   |
| Link Distance (ft)      |   | 3066  |   |   | 489   |   |  | 978   |   |   | 454   |   |
| Travel Time (s)         |   | 38.0  |   |   | 6.1   |   |  | 14.8  |   |   | 8.8   |   |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 0   | 1296  | 431   | 0   | 0   | 0   | 0  | 0   | 1479  | 0   | 1079  | 0   |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 0   | 1296  | 431   | 0   | 0   | 0   | 0  | 0   | 1479  | 0   | 1079  | 0   |
| Turn Type               |   | NA  | Perm  |   |   |   |  |   | Perm  |   | NA  |   |
| Protected Phases        |   | 2   |   |   |   |   |  |   |   |   | 8   |   |
| Permitted Phases        |   |   | 2   |   |   |   |  |   | 8   | 8   |   |   |
| Detector Phase          |   | 2   | 2   |   |   |   |  |   | 8   | 8   | 8   |   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     |   | 14.0  | 14.0  |   |   |   |  |   | 7.0   | 7.0   | 7.0   |   |
| Minimum Split (s)       |   | 20.8  | 20.8  |   |   |   |  |   | 13.2  | 13.2  | 13.2  |   |
| Total Split (s)         |   | 50.0  | 50.0  |   |   |   |  |   | 70.0  | 70.0  | 70.0  |   |
| Total Split (%)         |   | 41.7%   | 41.7%   |   |   |   |  |   | 58.3%   | 58.3%   | 58.3%   |   |
| Maximum Green (s)       |   | 43.2  | 43.2  |   |   |   |  |   | 63.8  | 63.8  | 63.8  |   |
| Yellow Time (s)         |   | 5.4   | 5.4   |   |   |   |  |   | 3.0   | 3.0   | 3.0   |   |
| All-Red Time (s)        |   | 1.4   | 1.4   |   |   |   |  |   | 3.2   | 3.2   | 3.2   |   |
| Lost Time Adjust (s)    |   | -1.8  | -1.8  |   |   |   |  |   | -1.2  |   | -1.2  |   |
| Total Lost Time (s)     |   | 5.0   | 5.0   |   |   |   |  |   | 5.0   |   | 5.0   |   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Vehicle Extension (s)   |   | 6.0   | 6.0   |   |   |   |  |   | 2.0   | 2.0   | 2.0   |   |
| Minimum Gap (s)         |   | 3.4   | 3.4   |   |   |   |  |   | 0.2   | 0.2   | 0.2   |   |
| Time Before Reduce (s)  |   | 15.0  | 15.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Time To Reduce (s)      |   | 45.0  | 45.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Recall Mode             |   | C-Min   | C-Min   |   |   |   |  |   | None  | None  | None  |   |
| Act Effect Green (s)    |   | 45.0  | 45.0  |   |   |   |  |   | 65.0  |   | 65.0  |   |
| Actuated g/C Ratio      |   | 0.38  | 0.38  |   |   |   |  |   | 0.54  |   | 0.54  |   |
| v/c Ratio               |   | 0.97  | 0.72  |   |   |   |  |   | 0.98  |   | 0.56  |   |
| Control Delay           |   | 55.0  | 40.2  |   |   |   |  |   | 47.4  |   | 19.6  |   |
| Queue Delay             |   | 0.0   | 0.0   |   |   |   |  |   | 0.0   |   | 0.0   |   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

No-Build (2024) PM  
Lanes, Volumes, Timings

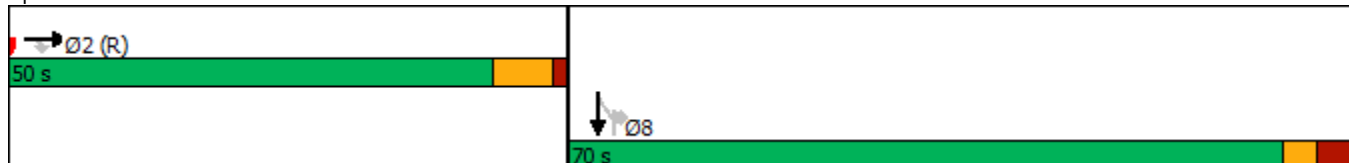


| Lane Group              | EBL | EBT  | EBR  | WBL | WBT | WBR | NBL | NBT  | NBR  | SBL | SBT  | SBR |
|-------------------------|-----|------|------|-----|-----|-----|-----|------|------|-----|------|-----|
| Total Delay             |     | 55.0 | 40.2 |     |     |     |     |      | 47.4 |     | 19.6 |     |
| LOS                     |     | E    | D    |     |     |     |     |      | D    |     | B    |     |
| Approach Delay          |     | 51.3 |      |     |     |     |     | 47.4 |      |     | 19.6 |     |
| Approach LOS            |     | D    |      |     |     |     |     | D    |      |     | B    |     |
| Queue Length 50th (ft)  |     | 512  | 283  |     |     |     |     |      | 613  |     | 278  |     |
| Queue Length 95th (ft)  |     | #668 | 408  |     |     |     |     |      | #817 |     | 341  |     |
| Internal Link Dist (ft) |     | 2986 |      |     | 409 |     |     | 898  |      |     | 374  |     |
| Turn Bay Length (ft)    |     |      | 175  |     |     |     |     |      |      |     |      |     |
| Base Capacity (vph)     |     | 1340 | 599  |     |     |     |     |      | 1502 |     | 1916 |     |
| Starvation Cap Reductn  |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Spillback Cap Reductn   |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Storage Cap Reductn     |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Reduced v/c Ratio       |     | 0.97 | 0.72 |     |     |     |     |      | 0.98 |     | 0.56 |     |

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 42.0  
 Intersection LOS: D  
 Intersection Capacity Utilization 129.6%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Richardson Rd & US 64 EB



Hackney Tract TIA  
5: U-Turn East & US 64 WB

No-Build (2024) PM  
Lanes, Volumes, Timings



| Lane Group              | EBT  | EBR  | WBL  | WBT   | NBL   | NBR  |
|-------------------------|------|------|------|-------|-------|------|
| Lane Configurations     |      |      |      | ↑↑    | ↑↑    |      |
| Traffic Volume (vph)    | 0    | 0    | 0    | 2166  | 472   | 0    |
| Future Volume (vph)     | 0    | 0    | 0    | 2166  | 472   | 0    |
| Ideal Flow (vphpl)      | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Lane Util. Factor       | 1.00 | 1.00 | 1.00 | 0.95  | 0.97  | 1.00 |
| Frt                     |      |      |      |       |       |      |
| Flt Protected           |      |      |      |       | 0.950 |      |
| Satd. Flow (prot)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Flt Permitted           |      |      |      |       | 0.950 |      |
| Satd. Flow (perm)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Right Turn on Red       |      | No   |      |       | No    | No   |
| Satd. Flow (RTOR)       |      |      |      |       |       |      |
| Link Speed (mph)        | 55   |      |      | 55    | 25    |      |
| Link Distance (ft)      | 459  |      |      | 2512  | 426   |      |
| Travel Time (s)         | 5.7  |      |      | 31.1  | 11.6  |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)         | 0    | 0    | 0    | 2407  | 524   | 0    |
| Shared Lane Traffic (%) |      |      |      |       |       |      |
| Lane Group Flow (vph)   | 0    | 0    | 0    | 2407  | 524   | 0    |
| Turn Type               |      |      |      | NA    | Prot  |      |
| Protected Phases        |      |      |      | 6     | 8     |      |
| Permitted Phases        |      |      |      |       |       |      |
| Detector Phase          |      |      |      | 6     | 8     |      |
| Switch Phase            |      |      |      |       |       |      |
| Minimum Initial (s)     |      |      |      | 14.0  | 7.0   |      |
| Minimum Split (s)       |      |      |      | 20.2  | 13.3  |      |
| Total Split (s)         |      |      |      | 70.0  | 20.0  |      |
| Total Split (%)         |      |      |      | 77.8% | 22.2% |      |
| Maximum Green (s)       |      |      |      | 63.8  | 13.7  |      |
| Yellow Time (s)         |      |      |      | 5.2   | 3.0   |      |
| All-Red Time (s)        |      |      |      | 1.0   | 3.3   |      |
| Lost Time Adjust (s)    |      |      |      | -1.2  | -1.3  |      |
| Total Lost Time (s)     |      |      |      | 5.0   | 5.0   |      |
| Lead/Lag                |      |      |      |       |       |      |
| Lead-Lag Optimize?      |      |      |      |       |       |      |
| Vehicle Extension (s)   |      |      |      | 6.0   | 2.0   |      |
| Minimum Gap (s)         |      |      |      | 3.4   | 0.2   |      |
| Time Before Reduce (s)  |      |      |      | 15.0  | 0.0   |      |
| Time To Reduce (s)      |      |      |      | 45.0  | 0.0   |      |
| Recall Mode             |      |      |      | C-Min | None  |      |
| Act Effct Green (s)     |      |      |      | 65.0  | 15.0  |      |
| Actuated g/C Ratio      |      |      |      | 0.72  | 0.17  |      |
| v/c Ratio               |      |      |      | 0.94  | 0.92  |      |
| Control Delay           |      |      |      | 20.5  | 59.9  |      |
| Queue Delay             |      |      |      | 0.0   | 0.0   |      |
| Total Delay             |      |      |      | 20.5  | 59.9  |      |
| LOS                     |      |      |      | C     | E     |      |
| Approach Delay          |      |      |      | 20.5  | 59.9  |      |
| Approach LOS            |      |      |      | C     | E     |      |



| Lane Group              | EBT | EBR | WBL | WBT  | NBL  | NBR |
|-------------------------|-----|-----|-----|------|------|-----|
| Queue Length 50th (ft)  |     |     |     | 523  | 152  |     |
| Queue Length 95th (ft)  |     |     |     | #847 | #246 |     |
| Internal Link Dist (ft) | 379 |     |     | 2432 | 346  |     |
| Turn Bay Length (ft)    |     |     |     |      |      |     |
| Base Capacity (vph)     |     |     |     | 2555 | 572  |     |
| Starvation Cap Reductn  |     |     |     | 0    | 0    |     |
| Spillback Cap Reductn   |     |     |     | 0    | 0    |     |
| Storage Cap Reductn     |     |     |     | 0    | 0    |     |
| Reduced v/c Ratio       |     |     |     | 0.94 | 0.92 |     |

Intersection Summary

|   |   |
|---|---|
| Area Type:  | Other   |
| Cycle Length:   | 90  |
| Actuated Cycle Length:  | 90  |
| Offset:   | 0 (0%), Referenced to phase 6:WBT, Start of Green |
| Natural Cycle:  | 90  |
| Control Type:   | Actuated-Coordinated                              |
| Maximum v/c Ratio:  | 0.94  |
| Intersection Signal Delay:  | 27.6  |
| Intersection LOS:   | C   |
| Intersection Capacity Utilization:  | 81.7%   |
| ICU Level of Service:   | D   |
| Analysis Period (min):  | 15  |
| # 95th percentile volume exceeds capacity, queue may be longer.<br>Queue shown is maximum after two cycles. |   |

Splits and Phases: 5: U-Turn East & US 64 WB





Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

Build (2024) AM  
Lanes, Volumes, Timings

| Lane Group              | EBL   | EBT   | EBR  | WBL   | WBT   | WBR   | NBL   | NBT   | NBR  | SBL   | SBT   | SBR   |
|-------------------------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| Lane Configurations     |       |       |      |       |       |       |       |       |      |       |       |       |
| Traffic Volume (vph)    | 54    | 70    | 22   | 101   | 70    | 120   | 37    | 110   | 131  | 93    | 102   | 48    |
| Future Volume (vph)     | 54    | 70    | 22   | 101   | 70    | 120   | 37    | 110   | 131  | 93    | 102   | 48    |
| Ideal Flow (vphp)       | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  | 1900  | 1900  | 1900 | 1900  | 1900  | 1900  |
| Storage Length (ft)     | 250   |       | 0    | 150   |       | 150   | 100   |       | 0    | 150   |       | 175   |
| Storage Lanes           | 1     |       | 0    | 1     |       | 1     | 1     |       | 0    | 1     |       | 1     |
| Taper Length (ft)       | 100   |       |      | 100   |       |       | 100   |       |      | 100   |       |       |
| Lane Util. Factor       | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00  |
| Frt                     |       | 0.965 |      |       |       | 0.850 |       | 0.918 |      |       |       | 0.850 |
| Flt Protected           | 0.950 |       |      | 0.950 |       |       | 0.950 |       |      | 0.950 |       |       |
| Satd. Flow (prot)       | 1770  | 1798  | 0    | 1770  | 1863  | 1583  | 1770  | 1710  | 0    | 1770  | 1863  | 1583  |
| Flt Permitted           | 0.706 |       |      | 0.691 |       |       | 0.684 |       |      | 0.594 |       |       |
| Satd. Flow (perm)       | 1315  | 1798  | 0    | 1287  | 1863  | 1583  | 1274  | 1710  | 0    | 1106  | 1863  | 1583  |
| Right Turn on Red       |       |       | No   |       |       | No    |       |       | No   |       |       | No    |
| Satd. Flow (RTOR)       |       |       |      |       |       |       |       |       |      |       |       |       |
| Link Speed (mph)        |       | 45    |      |       | 45    |       |       | 45    |      |       | 45    |       |
| Link Distance (ft)      |       | 1889  |      |       | 1311  |       |       | 1771  |      |       | 2925  |       |
| Travel Time (s)         |       | 28.6  |      |       | 19.9  |       |       | 26.8  |      |       | 44.3  |       |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90 | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90 | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 60    | 78    | 24   | 112   | 78    | 133   | 41    | 122   | 146  | 103   | 113   | 53    |
| Shared Lane Traffic (%) |       |       |      |       |       |       |       |       |      |       |       |       |
| Lane Group Flow (vph)   | 60    | 102   | 0    | 112   | 78    | 133   | 41    | 268   | 0    | 103   | 113   | 53    |
| Turn Type               | Perm  | NA    |      | Perm  | NA    | Perm  | Perm  | NA    |      | Perm  | NA    | Perm  |
| Protected Phases        |       | 2     |      |       | 6     |       |       | 4     |      |       | 8     |       |
| Permitted Phases        | 2     |       |      | 6     |       | 6     | 4     |       |      | 8     |       | 8     |
| Detector Phase          | 2     | 2     |      | 6     | 6     | 6     | 4     | 4     |      | 8     | 8     | 8     |
| Switch Phase            |       |       |      |       |       |       |       |       |      |       |       |       |
| Minimum Initial (s)     | 7.0   | 7.0   |      | 7.0   | 7.0   | 7.0   | 7.0   | 7.0   |      | 7.0   | 7.0   | 7.0   |
| Minimum Split (s)       | 14.0  | 14.0  |      | 14.0  | 14.0  | 14.0  | 14.0  | 14.0  |      | 14.0  | 14.0  | 14.0  |
| Total Split (s)         | 26.0  | 26.0  |      | 26.0  | 26.0  | 26.0  | 34.0  | 34.0  |      | 34.0  | 34.0  | 34.0  |
| Total Split (%)         | 43.3% | 43.3% |      | 43.3% | 43.3% | 43.3% | 56.7% | 56.7% |      | 56.7% | 56.7% | 56.7% |
| Maximum Green (s)       | 19.0  | 19.0  |      | 19.0  | 19.0  | 19.0  | 27.0  | 27.0  |      | 27.0  | 27.0  | 27.0  |
| Yellow Time (s)         | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |      | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  |      | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |      | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |      | 5.0   | 5.0   | 5.0   |
| Lead/Lag                |       |       |      |       |       |       |       |       |      |       |       |       |
| Lead-Lag Optimize?      |       |       |      |       |       |       |       |       |      |       |       |       |
| Vehicle Extension (s)   | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |      | 3.0   | 3.0   | 3.0   |
| Recall Mode             | Min   | Min   |      | Min   | Min   | Min   | None  | None  |      | None  | None  | None  |
| Act Effct Green (s)     | 12.2  | 12.2  |      | 12.2  | 12.2  | 12.2  | 12.8  | 12.8  |      | 12.8  | 12.8  | 12.8  |
| Actuated g/C Ratio      | 0.35  | 0.35  |      | 0.35  | 0.35  | 0.35  | 0.36  | 0.36  |      | 0.36  | 0.36  | 0.36  |
| v/c Ratio               | 0.13  | 0.16  |      | 0.25  | 0.12  | 0.24  | 0.09  | 0.43  |      | 0.26  | 0.17  | 0.09  |
| Control Delay           | 9.9   | 9.8   |      | 11.1  | 9.5   | 10.6  | 7.8   | 10.7  |      | 9.5   | 8.0   | 7.6   |
| Queue Delay             | 0.0   | 0.0   |      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |      | 0.0   | 0.0   | 0.0   |
| Total Delay             | 9.9   | 9.8   |      | 11.1  | 9.5   | 10.6  | 7.8   | 10.7  |      | 9.5   | 8.0   | 7.6   |
| LOS                     | A     | A     |      | B     | A     | B     | A     | B     |      | A     | A     | A     |
| Approach Delay          |       | 9.8   |      |       | 10.5  |       |       | 10.3  |      |       | 8.5   |       |
| Approach LOS            |       | A     |      |       | B     |       |       | B     |      |       | A     |       |

Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

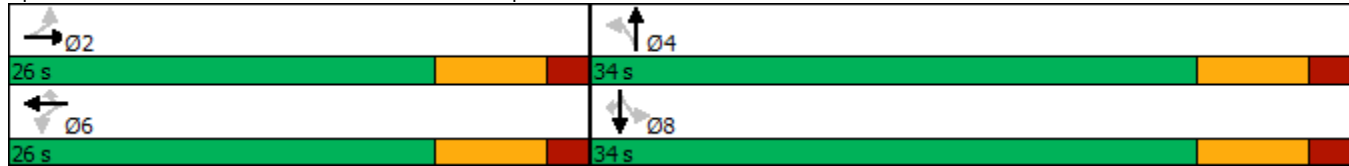
Build (2024) AM  
Lanes, Volumes, Timings



| Lane Group              | EBL  | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR | SBL  | SBT  | SBR  |
|-------------------------|------|------|-----|------|------|------|------|------|-----|------|------|------|
| Queue Length 50th (ft)  | 7    | 12   |     | 14   | 9    | 17   | 4    | 31   |     | 11   | 12   | 5    |
| Queue Length 95th (ft)  | 28   | 40   |     | 46   | 32   | 52   | 18   | 85   |     | 39   | 38   | 22   |
| Internal Link Dist (ft) |      | 1809 |     |      | 1231 |      |      | 1691 |     |      | 2845 |      |
| Turn Bay Length (ft)    | 250  |      |     | 150  |      | 150  | 100  |      |     | 150  |      | 175  |
| Base Capacity (vph)     | 796  | 1088 |     | 779  | 1128 | 958  | 1065 | 1430 |     | 924  | 1558 | 1323 |
| Starvation Cap Reductn  | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.08 | 0.09 |     | 0.14 | 0.07 | 0.14 | 0.04 | 0.19 |     | 0.11 | 0.07 | 0.04 |

| Intersection Summary              |                        |
|-----------------------------------|------------------------|
| Area Type:                        | Other                  |
| Cycle Length:                     | 60                     |
| Actuated Cycle Length:            | 35.2                   |
| Natural Cycle:                    | 40                     |
| Control Type:                     | Actuated-Uncoordinated |
| Maximum v/c Ratio:                | 0.43                   |
| Intersection Signal Delay:        | 9.8                    |
| Intersection Capacity Utilization | 44.4%                  |
| Analysis Period (min)             | 15                     |
| Intersection LOS:                 | A                      |
| ICU Level of Service              | A                      |

Splits and Phases: 1: Richardson Rd & Olive Chapel Rd



Hackney Tract TIA  
2: Apex Barbecue Rd & Olive Chapel Rd

Build (2024) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.9  |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 446  | 22   | 83   | 336  | 28   | 97   |
| Future Vol, veh/h        | 446  | 22   | 83   | 336  | 28   | 97   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 496  | 24   | 92   | 373  | 31   | 108  |

| Major/Minor          | Major1 | Major2 | Minor1 |   |             |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 0      | 0      | 520    | 0 | 1065 508    |
| Stage 1              | -      | -      | -      | - | 508 -       |
| Stage 2              | -      | -      | -      | - | 557 -       |
| Critical Hdwy        | -      | -      | 4.12   | - | 6.42 6.22   |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42 -      |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42 -      |
| Follow-up Hdwy       | -      | -      | 2.218  | - | 3.518 3.318 |
| Pot Cap-1 Maneuver   | -      | -      | 1046   | - | 246 565     |
| Stage 1              | -      | -      | -      | - | 604 -       |
| Stage 2              | -      | -      | -      | - | 574 -       |
| Platoon blocked, %   | -      | -      | -      | - | -           |
| Mov Cap-1 Maneuver   | -      | -      | 1046   | - | 219 565     |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 219 -       |
| Stage 1              | -      | -      | -      | - | 604 -       |
| Stage 2              | -      | -      | -      | - | 510 -       |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 1.7 | 17.9 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 417   | -   | -   | 1046  | -   |
| HCM Lane V/C Ratio    | 0.333 | -   | -   | 0.088 | -   |
| HCM Control Delay (s) | 17.9  | -   | -   | 8.8   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.4   | -   | -   | 0.3   | -   |

Hackney Tract TIA  
3: Richardson Rd & Little Gem Ln/Hasse Ave

Build (2024) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 3    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 1    | 0    | 1    | 15   | 0    | 167  | 2    | 478  | 10   | 67   | 503  | 1    |
| Future Vol, veh/h        | 1    | 0    | 1    | 15   | 0    | 167  | 2    | 478  | 10   | 67   | 503  | 1    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 1    | 0    | 1    | 17   | 0    | 186  | 2    | 531  | 11   | 74   | 559  | 1    |













| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 1342   | 1254  | 560    | 1249  | 1249   | 537   | 560    | 0 | 0 | 542   | 0 | 0 |
| Stage 1              | 708    | 708   | -      | 541   | 541    | -     | -      | - | - | -     | - | - |
| Stage 2              | 634    | 546   | -      | 708   | 708    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 129    | 172   | 528    | 150   | 173    | 544   | 1011   | - | - | 1027  | - | - |
| Stage 1              | 426    | 438   | -      | 525   | 521    | -     | -      | - | - | -     | - | - |
| Stage 2              | 467    | 518   | -      | 426   | 438    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 80     | 159   | 528    | 141   | 160    | 544   | 1011   | - | - | 1027  | - | - |
| Mov Cap-2 Maneuver   | 170    | 266   | -      | 267   | 279    | -     | -      | - | - | -     | - | - |
| Stage 1              | 425    | 406   | -      | 524   | 520    | -     | -      | - | - | -     | - | - |
| Stage 2              | 307    | 517   | -      | 394   | 406    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB |  | NB |  | SB |  |
|----------------------|------|--|----|--|----|--|----|--|
| HCM Control Delay, s | 19.1 |  | 17 |  | 0  |  | 1  |  |
| HCM LOS              | C    |  | C  |  |    |  |    |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 1011  | -   | -   | 257        | 501   | 1027  | -   |
| HCM Lane V/C Ratio    | 0.002 | -   | -   | 0.009      | 0.404 | 0.072 | -   |
| HCM Control Delay (s) | 8.6   | -   | -   | 19.1       | 17    | 8.8   | -   |
| HCM Lane LOS          | A     | -   | -   | C          | C     | A     | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0          | 1.9   | 0.2   | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Build (2024) AM  
Lanes, Volumes, Timings

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |   | ↑↑  | ↗   |   |   |   |  |   | ↖↖  |   | ↖↖  |   |
| Traffic Volume (vph)    | 0   | 1124  | 270   | 0   | 0   | 0   | 0  | 0   | 979   | 0   | 735   | 0   |
| Future Volume (vph)     | 0   | 1124  | 270   | 0   | 0   | 0   | 0  | 0   | 979   | 0   | 735   | 0   |
| Ideal Flow (vphpl)      | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)               |   | -2%   |   |   | 0%  |   |  | 1%  |   |   | 0%  |   |
| Storage Length (ft)     | 0   |   | 175   | 0   |   | 0   | 0  |   | 0   | 0   |   | 0   |
| Storage Lanes           | 0   |   | 1   | 0   |   | 0   | 0  |   | 2   | 0   |   | 0   |
| Taper Length (ft)       | 100   |   |   | 100   |   |   | 100  |   |   | 100   |   |   |
| Lane Util. Factor       | 1.00  | 0.95  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>         |   |   | 0.850   |   |   |   |  |   | 0.850   |   |   |   |
| Flt Protected           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (prot)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Flt Permitted           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (perm)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Right Turn on Red       |   |   | No  |   |   | No  |  |   | No  | No  |   | No  |
| Satd. Flow (RTOR)       |   |   |   |   |   |   |  |   |   |   |   |   |
| Link Speed (mph)        |   | 55  |   |   | 55  |   |  | 45  |   |   | 35  |   |
| Link Distance (ft)      |   | 3066  |   |   | 489   |   |  | 978   |   |   | 454   |   |
| Travel Time (s)         |   | 38.0  |   |   | 6.1   |   |  | 14.8  |   |   | 8.8   |   |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 0   | 1249  | 300   | 0   | 0   | 0   | 0  | 0   | 1088  | 0   | 817   | 0   |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 0   | 1249  | 300   | 0   | 0   | 0   | 0  | 0   | 1088  | 0   | 817   | 0   |
| Turn Type               |   | NA  | Perm  |   |   |   |  |   | Perm  |   | NA  |   |
| Protected Phases        |   | 2   |   |   |   |   |  |   |   |   | 8   |   |
| Permitted Phases        |   |   | 2   |   |   |   |  |   | 8   | 8   |   |   |
| Detector Phase          |   | 2   | 2   |   |   |   |  |   | 8   | 8   | 8   |   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     |   | 14.0  | 14.0  |   |   |   |  |   | 7.0   | 7.0   | 7.0   |   |
| Minimum Split (s)       |   | 20.8  | 20.8  |   |   |   |  |   | 13.2  | 13.2  | 13.2  |   |
| Total Split (s)         |   | 29.0  | 29.0  |   |   |   |  |   | 31.0  | 31.0  | 31.0  |   |
| Total Split (%)         |   | 48.3%   | 48.3%   |   |   |   |  |   | 51.7%   | 51.7%   | 51.7%   |   |
| Maximum Green (s)       |   | 22.2  | 22.2  |   |   |   |  |   | 24.8  | 24.8  | 24.8  |   |
| Yellow Time (s)         |   | 5.4   | 5.4   |   |   |   |  |   | 3.0   | 3.0   | 3.0   |   |
| All-Red Time (s)        |   | 1.4   | 1.4   |   |   |   |  |   | 3.2   | 3.2   | 3.2   |   |
| Lost Time Adjust (s)    |   | -1.8  | -1.8  |   |   |   |  |   | -1.3  |   | -1.2  |   |
| Total Lost Time (s)     |   | 5.0   | 5.0   |   |   |   |  |   | 4.9   |   | 5.0   |   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Vehicle Extension (s)   |   | 6.0   | 6.0   |   |   |   |  |   | 2.0   | 2.0   | 2.0   |   |
| Minimum Gap (s)         |   | 3.4   | 3.4   |   |   |   |  |   | 0.2   | 0.2   | 0.2   |   |
| Time Before Reduce (s)  |   | 15.0  | 15.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Time To Reduce (s)      |   | 45.0  | 45.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Recall Mode             |   | C-Min   | C-Min   |   |   |   |  |   | None  | None  | None  |   |
| Act Effect Green (s)    |   | 24.0  | 24.0  |   |   |   |  |   | 26.1  |   | 26.0  |   |
| Actuated g/C Ratio      |   | 0.40  | 0.40  |   |   |   |  |   | 0.44  |   | 0.43  |   |
| v/c Ratio               |   | 0.87  | 0.47  |   |   |   |  |   | 0.90  |   | 0.53  |   |
| Control Delay           |   | 25.5  | 16.3  |   |   |   |  |   | 28.5  |   | 9.8   |   |
| Queue Delay             |   | 0.0   | 0.0   |   |   |   |  |   | 0.0   |   | 0.0   |   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Build (2024) AM  
Lanes, Volumes, Timings

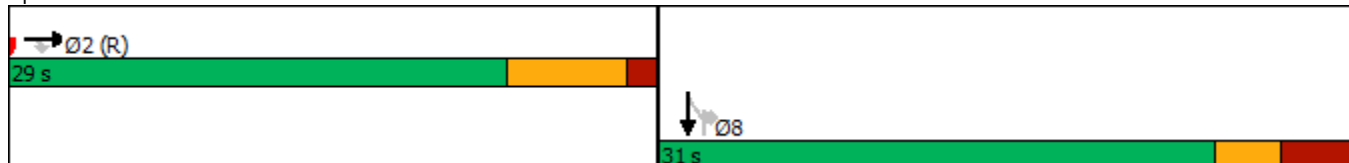


| Lane Group              | EBL | EBT  | EBR  | WBL | WBT | WBR | NBL | NBT  | NBR  | SBL | SBT  | SBR |
|-------------------------|-----|------|------|-----|-----|-----|-----|------|------|-----|------|-----|
| Total Delay             |     | 25.5 | 16.3 |     |     |     |     |      | 28.5 |     | 9.8  |     |
| LOS                     |     | C    | B    |     |     |     |     |      | C    |     | A    |     |
| Approach Delay          |     | 23.7 |      |     |     |     |     | 28.5 |      |     | 9.8  |     |
| Approach LOS            |     | C    |      |     |     |     |     | C    |      |     | A    |     |
| Queue Length 50th (ft)  |     | 210  | 77   |     |     |     |     |      | 197  |     | 99   |     |
| Queue Length 95th (ft)  |     | #333 | 138  |     |     |     |     |      | #333 |     | m110 |     |
| Internal Link Dist (ft) |     | 2986 |      |     |     | 409 |     | 898  |      |     | 374  |     |
| Turn Bay Length (ft)    |     |      | 175  |     |     |     |     |      |      |     |      |     |
| Base Capacity (vph)     |     | 1430 | 639  |     |     |     |     |      | 1206 |     | 1533 |     |
| Starvation Cap Reductn  |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Spillback Cap Reductn   |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Storage Cap Reductn     |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Reduced v/c Ratio       |     | 0.87 | 0.47 |     |     |     |     |      | 0.90 |     | 0.53 |     |

Intersection Summary

Area Type: Other  
 Cycle Length: 60  
 Actuated Cycle Length: 60  
 Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 22.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 103.0%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Richardson Rd & US 64 EB





Hackney Tract TIA  
5: U-Turn East & US 64 WB

Build (2024) AM  
Lanes, Volumes, Timings



| Lane Group              | EBT  | EBR  | WBL  | WBT   | NBL   | NBR  |
|-------------------------|------|------|------|-------|-------|------|
| Lane Configurations     |      |      |      | ↑↑    | ↑↑    |      |
| Traffic Volume (vph)    | 0    | 0    | 0    | 1786  | 258   | 0    |
| Future Volume (vph)     | 0    | 0    | 0    | 1786  | 258   | 0    |
| Ideal Flow (vphpl)      | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Lane Util. Factor       | 1.00 | 1.00 | 1.00 | 0.95  | 0.97  | 1.00 |
| Frt                     |      |      |      |       |       |      |
| Flt Protected           |      |      |      |       | 0.950 |      |
| Satd. Flow (prot)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Flt Permitted           |      |      |      |       | 0.950 |      |
| Satd. Flow (perm)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Right Turn on Red       |      | No   |      |       | No    | No   |
| Satd. Flow (RTOR)       |      |      |      |       |       |      |
| Link Speed (mph)        | 55   |      |      | 55    | 25    |      |
| Link Distance (ft)      | 459  |      |      | 2512  | 426   |      |
| Travel Time (s)         | 5.7  |      |      | 31.1  | 11.6  |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)         | 0    | 0    | 0    | 1984  | 287   | 0    |
| Shared Lane Traffic (%) |      |      |      |       |       |      |
| Lane Group Flow (vph)   | 0    | 0    | 0    | 1984  | 287   | 0    |
| Turn Type               |      |      |      | NA    | Prot  |      |
| Protected Phases        |      |      |      | 6     | 8     |      |
| Permitted Phases        |      |      |      |       |       |      |
| Detector Phase          |      |      |      | 6     | 8     |      |
| Switch Phase            |      |      |      |       |       |      |
| Minimum Initial (s)     |      |      |      | 14.0  | 7.0   |      |
| Minimum Split (s)       |      |      |      | 21.2  | 14.0  |      |
| Total Split (s)         |      |      |      | 46.0  | 14.0  |      |
| Total Split (%)         |      |      |      | 76.7% | 23.3% |      |
| Maximum Green (s)       |      |      |      | 39.8  | 7.7   |      |
| Yellow Time (s)         |      |      |      | 5.2   | 3.0   |      |
| All-Red Time (s)        |      |      |      | 1.0   | 3.3   |      |
| Lost Time Adjust (s)    |      |      |      | -1.2  | -1.3  |      |
| Total Lost Time (s)     |      |      |      | 5.0   | 5.0   |      |
| Lead/Lag                |      |      |      |       |       |      |
| Lead-Lag Optimize?      |      |      |      |       |       |      |
| Vehicle Extension (s)   |      |      |      | 6.0   | 2.0   |      |
| Minimum Gap (s)         |      |      |      | 3.4   | 0.2   |      |
| Time Before Reduce (s)  |      |      |      | 15.0  | 0.0   |      |
| Time To Reduce (s)      |      |      |      | 45.0  | 0.0   |      |
| Recall Mode             |      |      |      | C-Min | None  |      |
| Act Effct Green (s)     |      |      |      | 41.1  | 8.9   |      |
| Actuated g/C Ratio      |      |      |      | 0.68  | 0.15  |      |
| v/c Ratio               |      |      |      | 0.82  | 0.57  |      |
| Control Delay           |      |      |      | 10.5  | 26.5  |      |
| Queue Delay             |      |      |      | 0.0   | 0.0   |      |
| Total Delay             |      |      |      | 10.5  | 26.5  |      |
| LOS                     |      |      |      | B     | C     |      |
| Approach Delay          |      |      |      | 10.5  | 26.5  |      |
| Approach LOS            |      |      |      | B     | C     |      |



| Lane Group              | EBT | EBR | WBL | WBT  | NBL  | NBR |
|-------------------------|-----|-----|-----|------|------|-----|
| Queue Length 50th (ft)  |     |     |     | 215  | 51   |     |
| Queue Length 95th (ft)  |     |     |     | 312  | m59  |     |
| Internal Link Dist (ft) | 379 |     |     | 2432 | 346  |     |
| Turn Bay Length (ft)    |     |     |     |      |      |     |
| Base Capacity (vph)     |     |     |     | 2426 | 514  |     |
| Starvation Cap Reductn  |     |     |     | 0    | 0    |     |
| Spillback Cap Reductn   |     |     |     | 0    | 0    |     |
| Storage Cap Reductn     |     |     |     | 0    | 0    |     |
| Reduced v/c Ratio       |     |     |     | 0.82 | 0.56 |     |

Intersection Summary

|   |   |
|---|---|
| Area Type:  | Other   |
| Cycle Length:   | 60  |
| Actuated Cycle Length:  | 60  |
| Offset:   | 0 (0%), Referenced to phase 6:WBT, Start of Green |
| Natural Cycle:  | 60  |
| Control Type:   | Actuated-Coordinated                              |
| Maximum v/c Ratio:  | 0.82  |
| Intersection Signal Delay:  | 12.5  |
| Intersection LOS:   | B   |
| Intersection Capacity Utilization:                                | 65.1%   |
| ICU Level of Service:   | C   |
| Analysis Period (min):  | 15  |
| m Volume for 95th percentile queue is metered by upstream signal. |   |

Splits and Phases: 5: U-Turn East & US 64 WB



Hackney Tract TIA  
6: Olive Chapel Rd & Hasse Ave

Build (2024) AM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 0.8  |      |      |      |      |      |
| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 5    | 439  | 355  | 9    | 29   | 13   |
| Future Vol, veh/h        | 5    | 439  | 355  | 9    | 29   | 13   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | 100  | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 6    | 488  | 394  | 10   | 32   | 14   |
























| Major/Minor          | Major1 | Major2 | Minor2 |   |       |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 404    | 0      | -      | 0 | 894   |
| Stage 1              | -      | -      | -      | - | 394   |
| Stage 2              | -      | -      | -      | - | 500   |
| Critical Hdwy        | 4.12   | -      | -      | - | 6.42  |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42  |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42  |
| Follow-up Hdwy       | 2.218  | -      | -      | - | 3.518 |
| Pot Cap-1 Maneuver   | 1155   | -      | -      | - | 312   |
| Stage 1              | -      | -      | -      | - | 681   |
| Stage 2              | -      | -      | -      | - | 609   |
| Platoon blocked, %   |        | -      | -      | - |       |
| Mov Cap-1 Maneuver   | 1155   | -      | -      | - | 310   |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 310   |
| Stage 1              | -      | -      | -      | - | 678   |
| Stage 2              | -      | -      | -      | - | 609   |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 16.1 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 1155  | -   | -   | -   | 370   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.126 |
| HCM Control Delay (s) | 8.1   | -   | -   | -   | 16.1  |
| HCM Lane LOS          | A     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0.4   |

Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

Build (2024) PM  
Lanes, Volumes, Timings

|                         |  |  |  |  |  |  |   |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |  |  |   |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 58  | 125   | 41  | 172   | 107   | 139   | 31  | 103   | 174   | 139   | 147   | 55  |
| Future Volume (vph)     | 58  | 125   | 41  | 172   | 107   | 139   | 31  | 103   | 174   | 139   | 147   | 55  |
| Ideal Flow (vphp)       | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Storage Length (ft)     | 250   |   | 0   | 150   |   | 150   | 100   |   | 0   | 150   |   | 175   |
| Storage Lanes           | 1   |   | 0   | 1   |   | 1   | 1   |   | 0   | 1   |   | 1   |
| Taper Length (ft)       | 100   |   |   | 100   |   |   | 100   |   |   | 100   |   |   |
| Lane Util. Factor       | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                     |   | 0.963   |   |   |   | 0.850   |   | 0.906   |   |   |   | 0.850   |
| Flt Protected           | 0.950   |   |   | 0.950   |   |   | 0.950   |   |   | 0.950   |   |   |
| Satd. Flow (prot)       | 1770  | 1794  | 0   | 1770  | 1863  | 1583  | 1770  | 1688  | 0   | 1770  | 1863  | 1583  |
| Flt Permitted           | 0.681   |   |   | 0.641   |   |   | 0.654   |   |   | 0.573   |   |   |
| Satd. Flow (perm)       | 1269  | 1794  | 0   | 1194  | 1863  | 1583  | 1218  | 1688  | 0   | 1067  | 1863  | 1583  |
| Right Turn on Red       |   |   | No  |   |   | No  |   |   | No  |   |   | No  |
| Satd. Flow (RTOR)       |   |   |   |   |   |   |   |   |   |   |   |   |
| Link Speed (mph)        |   | 45  |   |   | 45  |   |   | 45  |   |   | 45  |   |
| Link Distance (ft)      |   | 1889  |   |   | 1311  |   |   | 1771  |   |   | 2925  |   |
| Travel Time (s)         |   | 28.6  |   |   | 19.9  |   |   | 26.8  |   |   | 44.3  |   |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 64  | 139   | 46  | 191   | 119   | 154   | 34  | 114   | 193   | 154   | 163   | 61  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |   |   |   |   |   |   |
| Lane Group Flow (vph)   | 64  | 185   | 0   | 191   | 119   | 154   | 34  | 307   | 0   | 154   | 163   | 61  |
| Turn Type               | Perm  | NA  |   | Perm  | NA  | Perm  | Perm  | NA  |   | Perm  | NA  | Perm  |
| Protected Phases        |   | 2   |   |   | 6   |   |   | 4   |   |   |   | 8   |
| Permitted Phases        | 2   |   |   | 6   |   | 6   | 4   |   |   | 8   |   | 8   |
| Detector Phase          | 2   | 2   |   | 6   | 6   | 6   | 4   | 4   |   | 8   | 8   | 8   |
| Switch Phase            |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)     | 7.0   | 7.0   |   | 7.0   | 7.0   | 7.0   | 7.0   | 7.0   |   | 7.0   | 7.0   | 7.0   |
| Minimum Split (s)       | 14.0  | 14.0  |   | 14.0  | 14.0  | 14.0  | 14.0  | 14.0  |   | 14.0  | 14.0  | 14.0  |
| Total Split (s)         | 29.0  | 29.0  |   | 29.0  | 29.0  | 29.0  | 31.0  | 31.0  |   | 31.0  | 31.0  | 31.0  |
| Total Split (%)         | 48.3%   | 48.3%   |   | 48.3%   | 48.3%   | 48.3%   | 51.7%   | 51.7%   |   | 51.7%   | 51.7%   | 51.7%   |
| Maximum Green (s)       | 22.0  | 22.0  |   | 22.0  | 22.0  | 22.0  | 24.0  | 24.0  |   | 24.0  | 24.0  | 24.0  |
| Yellow Time (s)         | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   |
| All-Red Time (s)        | 2.0   | 2.0   |   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s)    | -2.0  | -2.0  |   | -2.0  | -2.0  | -2.0  | -2.0  | -2.0  |   | -2.0  | -2.0  | -2.0  |
| Total Lost Time (s)     | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |   | 5.0   | 5.0   | 5.0   |
| Lead/Lag                |   |   |   |   |   |   |   |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |   |   |   |   |   |   |
| Vehicle Extension (s)   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |
| Recall Mode             | Min   | Min   |   | Min   | Min   | Min   | None  | None  |   | None  | None  | None  |
| Act Effct Green (s)     | 14.5  | 14.5  |   | 14.5  | 14.5  | 14.5  | 15.0  | 15.0  |   | 15.0  | 15.0  | 15.0  |
| Actuated g/C Ratio      | 0.36  | 0.36  |   | 0.36  | 0.36  | 0.36  | 0.37  | 0.37  |   | 0.37  | 0.37  | 0.37  |
| v/c Ratio               | 0.14  | 0.29  |   | 0.44  | 0.18  | 0.27  | 0.07  | 0.49  |   | 0.39  | 0.23  | 0.10  |
| Control Delay           | 10.3  | 11.1  |   | 14.2  | 10.2  | 11.2  | 9.8   | 13.4  |   | 13.6  | 10.5  | 9.7   |
| Queue Delay             | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 10.3  | 11.1  |   | 14.2  | 10.2  | 11.2  | 9.8   | 13.4  |   | 13.6  | 10.5  | 9.7   |
| LOS                     | B   | B   |   | B   | B   | B   | A   | B   |   | B   | B   | A   |
| Approach Delay          |   | 10.9  |   |   | 12.2  |   |   | 13.0  |   |   | 11.6  |   |
| Approach LOS            |   | B   |   |   | B   |   |   | B   |   |   | B   |   |

Hackney Tract TIA  
1: Richardson Rd & Olive Chapel Rd

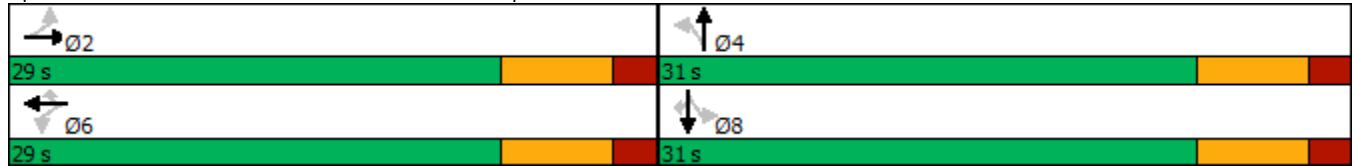
Build (2024) PM  
Lanes, Volumes, Timings



| Lane Group              | EBL  | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR | SBL  | SBT  | SBR  |
|-------------------------|------|------|-----|------|------|------|------|------|-----|------|------|------|
| Queue Length 50th (ft)  | 9    | 26   |     | 29   | 16   | 22   | 4    | 45   |     | 22   | 21   | 8    |
| Queue Length 95th (ft)  | 33   | 77   |     | 89   | 52   | 67   | 21   | 131  |     | 75   | 69   | 31   |
| Internal Link Dist (ft) |      | 1809 |     |      | 1231 |      |      | 1691 |     |      | 2845 |      |
| Turn Bay Length (ft)    | 250  |      |     | 150  |      | 150  | 100  |      |     | 150  |      | 175  |
| Base Capacity (vph)     | 804  | 1137 |     | 757  | 1181 | 1004 | 836  | 1159 |     | 733  | 1280 | 1088 |
| Starvation Cap Reductn  | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    |     | 0    | 0    | 0    | 0    | 0    |     | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.08 | 0.16 |     | 0.25 | 0.10 | 0.15 | 0.04 | 0.26 |     | 0.21 | 0.13 | 0.06 |

| Intersection Summary              |                        |
|-----------------------------------|------------------------|
| Area Type:                        | Other                  |
| Cycle Length:                     | 60                     |
| Actuated Cycle Length:            | 40.2                   |
| Natural Cycle:                    | 40                     |
| Control Type:                     | Actuated-Uncoordinated |
| Maximum v/c Ratio:                | 0.49                   |
| Intersection Signal Delay:        | 12.0                   |
| Intersection LOS:                 | B                      |
| Intersection Capacity Utilization | 59.1%                  |
| ICU Level of Service              | B                      |
| Analysis Period (min)             | 15                     |

Splits and Phases: 1: Richardson Rd & Olive Chapel Rd



Hackney Tract TIA  
 2: Apex Barbecue Rd & Olive Chapel Rd

Build (2024) PM  
 HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 18   |      |      |      |      |      |
| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 537  | 47   | 235  | 599  | 30   | 168  |
| Future Vol, veh/h        | 537  | 47   | 235  | 599  | 30   | 168  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 597  | 52   | 261  | 666  | 33   | 187  |

| Major/Minor          | Major1 | Major2 | Minor1 |   |             |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 0      | 0      | 649    | 0 | 1811 623    |
| Stage 1              | -      | -      | -      | - | 623 -       |
| Stage 2              | -      | -      | -      | - | 1188 -      |
| Critical Hdwy        | -      | -      | 4.12   | - | 6.42 6.22   |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42 -      |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42 -      |
| Follow-up Hdwy       | -      | -      | 2.218  | - | 3.518 3.318 |
| Pot Cap-1 Maneuver   | -      | -      | 937    | - | 86 486      |
| Stage 1              | -      | -      | -      | - | 535 -       |
| Stage 2              | -      | -      | -      | - | 289 -       |
| Platoon blocked, %   | -      | -      | -      | - | -           |
| Mov Cap-1 Maneuver   | -      | -      | 937    | - | 48 486      |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 48 -        |
| Stage 1              | -      | -      | -      | - | 535 -       |
| Stage 2              | -      | -      | -      | - | 161 -       |

| Approach             | EB | WB  | NB    |
|----------------------|----|-----|-------|
| HCM Control Delay, s | 0  | 2.9 | 134.5 |
| HCM LOS              |    |     | F     |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 204   | -   | -   | 937   | -   |
| HCM Lane V/C Ratio    | 1.078 | -   | -   | 0.279 | -   |
| HCM Control Delay (s) | 134.5 | -   | -   | 10.3  | 0   |
| HCM Lane LOS          | F     | -   | -   | B     | A   |
| HCM 95th %tile Q(veh) | 10.1  | -   | -   | 1.1   | -   |



Hackney Tract TIA  
3: Richardson Rd & Little Gem Ln/Hasse Ave

Build (2024) PM  
HCM 6th TWSC

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 3.1  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      | ↕    | ↕    |      | ↕    | ↕    |      |
| Traffic Vol, veh/h       | 2    | 1    | 3    | 15   | 1    | 116  | 2    | 599  | 23   | 178  | 648  | 3    |
| Future Vol, veh/h        | 2    | 1    | 3    | 15   | 1    | 116  | 2    | 599  | 23   | 178  | 648  | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | 125  | -    | -    | 150  | -    | -    |
| Veh in Median Storage, # | -    | 1    | -    | -    | 1    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 2    | 1    | 3    | 17   | 1    | 129  | 2    | 666  | 26   | 198  | 720  | 3    |













| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 1866   | 1814  | 722    | 1803  | 1802   | 679   | 723    | 0 | 0 | 692   | 0 | 0 |
| Stage 1              | 1118   | 1118  | -      | 683   | 683    | -     | -      | - | - | -     | - | - |
| Stage 2              | 748    | 696   | -      | 1120  | 1119   | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | - | - | 4.12  | - | - |
| Critical Hdwy Stg 1  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | - | - | 2.218 | - | - |
| Pot Cap-1 Maneuver   | 56     | 78    | 427    | 62    | 80     | 452   | 879    | - | - | 903   | - | - |
| Stage 1              | 251    | 282   | -      | 439   | 449    | -     | -      | - | - | -     | - | - |
| Stage 2              | 404    | 443   | -      | 251   | 282    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 33     | 61    | 427    | 51    | 62     | 452   | 879    | - | - | 903   | - | - |
| Mov Cap-2 Maneuver   | 71     | 133   | -      | 140   | 158    | -     | -      | - | - | -     | - | - |
| Stage 1              | 250    | 220   | -      | 438   | 448    | -     | -      | - | - | -     | - | - |
| Stage 2              | 287    | 442   | -      | 193   | 220    | -     | -      | - | - | -     | - | - |

| Approach             | EB |  | WB   |  | NB |  | SB  |  |
|----------------------|----|--|------|--|----|--|-----|--|
| HCM Control Delay, s | 32 |  | 21.9 |  | 0  |  | 2.2 |  |
| HCM LOS              | D  |  | C    |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 879   | -   | -   | 140        | 357   | 903   | -   |
| HCM Lane V/C Ratio    | 0.003 | -   | -   | 0.048      | 0.411 | 0.219 | -   |
| HCM Control Delay (s) | 9.1   | -   | -   | 32         | 21.9  | 10.1  | -   |
| HCM Lane LOS          | A     | -   | -   | D          | C     | B     | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0.1        | 1.9   | 0.8   | -   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Build (2024) PM  
Lanes, Volumes, Timings

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |   | ↑↑  | ↗   |   |   |   |  |   | ↖↖  |   | ↖↖  |   |
| Traffic Volume (vph)    | 0   | 1166  | 399   | 0   | 0   | 0   | 0  | 0   | 1371  | 0   | 1027  | 0   |
| Future Volume (vph)     | 0   | 1166  | 399   | 0   | 0   | 0   | 0  | 0   | 1371  | 0   | 1027  | 0   |
| Ideal Flow (vphpl)      | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Grade (%)               |   | -2%   |   |   | 0%  |   |  | 1%  |   |   | 0%  |   |
| Storage Length (ft)     | 0   |   | 175   | 0   |   | 0   | 0  |   | 0   | 0   |   | 0   |
| Storage Lanes           | 0   |   | 1   | 0   |   | 0   | 0  |   | 2   | 0   |   | 0   |
| Taper Length (ft)       | 100   |   |   | 100   |   |   | 100  |   |   | 100   |   |   |
| Lane Util. Factor       | 1.00  | 0.95  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 0.88  | 0.95  | 0.95  | 1.00  |
| Fr <sub>t</sub>         |   | 0.850   |   |   |   |   |  |   | 0.850   |   |   |   |
| Flt Protected           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (prot)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Flt Permitted           |   |   |   |   |   |   |  |   |   |   |   |   |
| Satd. Flow (perm)       | 0   | 3575  | 1599  | 0   | 0   | 0   | 0  | 0   | 2773  | 0   | 3539  | 0   |
| Right Turn on Red       |   |   | No  |   |   | No  |  |   | No  | No  |   | No  |
| Satd. Flow (RTOR)       |   |   |   |   |   |   |  |   |   |   |   |   |
| Link Speed (mph)        |   | 55  |   |   | 55  |   |  | 45  |   |   | 35  |   |
| Link Distance (ft)      |   | 3066  |   |   | 489   |   |  | 978   |   |   | 454   |   |
| Travel Time (s)         |   | 38.0  |   |   | 6.1   |   |  | 14.8  |   |   | 8.8   |   |
| Peak Hour Factor        | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)         | 0   | 1296  | 443   | 0   | 0   | 0   | 0  | 0   | 1523  | 0   | 1141  | 0   |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 0   | 1296  | 443   | 0   | 0   | 0   | 0  | 0   | 1523  | 0   | 1141  | 0   |
| Turn Type               |   | NA  | Perm  |   |   |   |  |   | Perm  |   | NA  |   |
| Protected Phases        |   | 2   |   |   |   |   |  |   |   |   | 8   |   |
| Permitted Phases        |   |   | 2   |   |   |   |  |   | 8   | 8   |   |   |
| Detector Phase          |   | 2   | 2   |   |   |   |  |   | 8   | 8   | 8   |   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     |   | 14.0  | 14.0  |   |   |   |  |   | 7.0   | 7.0   | 7.0   |   |
| Minimum Split (s)       |   | 20.8  | 20.8  |   |   |   |  |   | 13.2  | 13.2  | 13.2  |   |
| Total Split (s)         |   | 49.0  | 49.0  |   |   |   |  |   | 71.0  | 71.0  | 71.0  |   |
| Total Split (%)         |   | 40.8%   | 40.8%   |   |   |   |  |   | 59.2%   | 59.2%   | 59.2%   |   |
| Maximum Green (s)       |   | 42.2  | 42.2  |   |   |   |  |   | 64.8  | 64.8  | 64.8  |   |
| Yellow Time (s)         |   | 5.4   | 5.4   |   |   |   |  |   | 3.0   | 3.0   | 3.0   |   |
| All-Red Time (s)        |   | 1.4   | 1.4   |   |   |   |  |   | 3.2   | 3.2   | 3.2   |   |
| Lost Time Adjust (s)    |   | -1.8  | -1.8  |   |   |   |  |   | -1.2  |   | -1.2  |   |
| Total Lost Time (s)     |   | 5.0   | 5.0   |   |   |   |  |   | 5.0   |   | 5.0   |   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Vehicle Extension (s)   |   | 6.0   | 6.0   |   |   |   |  |   | 2.0   | 2.0   | 2.0   |   |
| Minimum Gap (s)         |   | 3.4   | 3.4   |   |   |   |  |   | 0.2   | 0.2   | 0.2   |   |
| Time Before Reduce (s)  |   | 15.0  | 15.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Time To Reduce (s)      |   | 45.0  | 45.0  |   |   |   |  |   | 0.0   | 0.0   | 0.0   |   |
| Recall Mode             |   | C-Min   | C-Min   |   |   |   |  |   | None  | None  | None  |   |
| Act Effect Green (s)    |   | 44.0  | 44.0  |   |   |   |  |   | 66.0  |   | 66.0  |   |
| Actuated g/C Ratio      |   | 0.37  | 0.37  |   |   |   |  |   | 0.55  |   | 0.55  |   |
| v/c Ratio               |   | 0.99  | 0.76  |   |   |   |  |   | 1.00  |   | 0.59  |   |
| Control Delay           |   | 60.5  | 43.0  |   |   |   |  |   | 50.1  |   | 19.5  |   |
| Queue Delay             |   | 0.0   | 0.0   |   |   |   |  |   | 0.0   |   | 0.0   |   |

Hackney Tract TIA  
4: Richardson Rd & US 64 EB

Build (2024) PM  
Lanes, Volumes, Timings

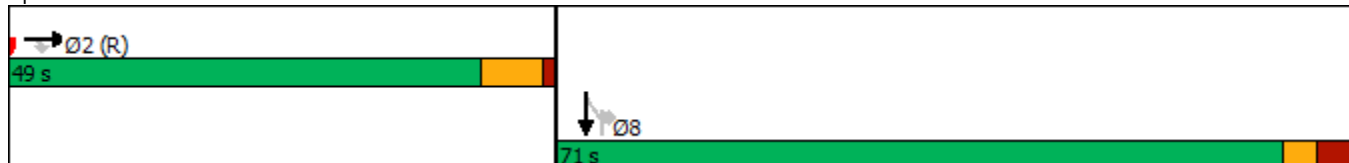


| Lane Group              | EBL | EBT  | EBR  | WBL | WBT | WBR | NBL | NBT  | NBR  | SBL | SBT  | SBR |
|-------------------------|-----|------|------|-----|-----|-----|-----|------|------|-----|------|-----|
| Total Delay             |     | 60.5 | 43.0 |     |     |     |     |      | 50.1 |     | 19.5 |     |
| LOS                     |     | E    | D    |     |     |     |     |      | D    |     | B    |     |
| Approach Delay          |     | 56.0 |      |     |     |     |     | 50.1 |      |     | 19.5 |     |
| Approach LOS            |     | E    |      |     |     |     |     | D    |      |     | B    |     |
| Queue Length 50th (ft)  |     | 520  | 298  |     |     |     |     |      | 640  |     | 295  |     |
| Queue Length 95th (ft)  |     | #681 | 430  |     |     |     |     |      | #847 |     | 361  |     |
| Internal Link Dist (ft) |     | 2986 |      |     | 409 |     |     | 898  |      |     | 374  |     |
| Turn Bay Length (ft)    |     |      | 175  |     |     |     |     |      |      |     |      |     |
| Base Capacity (vph)     |     | 1310 | 586  |     |     |     |     |      | 1525 |     | 1946 |     |
| Starvation Cap Reductn  |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Spillback Cap Reductn   |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Storage Cap Reductn     |     | 0    | 0    |     |     |     |     |      | 0    |     | 0    |     |
| Reduced v/c Ratio       |     | 0.99 | 0.76 |     |     |     |     |      | 1.00 |     | 0.59 |     |

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:EBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.00  
 Intersection Signal Delay: 44.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 134.1%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Richardson Rd & US 64 EB



Hackney Tract TIA  
5: U-Turn East & US 64 WB

Build (2024) PM  
Lanes, Volumes, Timings



| Lane Group              | EBT  | EBR  | WBL  | WBT   | NBL   | NBR  |
|-------------------------|------|------|------|-------|-------|------|
| Lane Configurations     |      |      |      | ↑↑    | ↑↑    |      |
| Traffic Volume (vph)    | 0    | 0    | 0    | 2222  | 479   | 0    |
| Future Volume (vph)     | 0    | 0    | 0    | 2222  | 479   | 0    |
| Ideal Flow (vphpl)      | 1900 | 1900 | 1900 | 1900  | 1900  | 1900 |
| Lane Util. Factor       | 1.00 | 1.00 | 1.00 | 0.95  | 0.97  | 1.00 |
| Frt                     |      |      |      |       |       |      |
| Flt Protected           |      |      |      |       | 0.950 |      |
| Satd. Flow (prot)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Flt Permitted           |      |      |      |       | 0.950 |      |
| Satd. Flow (perm)       | 0    | 0    | 0    | 3539  | 3433  | 0    |
| Right Turn on Red       |      | No   |      |       | No    | No   |
| Satd. Flow (RTOR)       |      |      |      |       |       |      |
| Link Speed (mph)        | 55   |      |      | 55    | 25    |      |
| Link Distance (ft)      | 459  |      |      | 2512  | 426   |      |
| Travel Time (s)         | 5.7  |      |      | 31.1  | 11.6  |      |
| Peak Hour Factor        | 0.90 | 0.90 | 0.90 | 0.90  | 0.90  | 0.90 |
| Adj. Flow (vph)         | 0    | 0    | 0    | 2469  | 532   | 0    |
| Shared Lane Traffic (%) |      |      |      |       |       |      |
| Lane Group Flow (vph)   | 0    | 0    | 0    | 2469  | 532   | 0    |
| Turn Type               |      |      |      | NA    | Prot  |      |
| Protected Phases        |      |      |      | 6     | 8     |      |
| Permitted Phases        |      |      |      |       |       |      |
| Detector Phase          |      |      |      | 6     | 8     |      |
| Switch Phase            |      |      |      |       |       |      |
| Minimum Initial (s)     |      |      |      | 14.0  | 7.0   |      |
| Minimum Split (s)       |      |      |      | 20.2  | 13.3  |      |
| Total Split (s)         |      |      |      | 70.0  | 20.0  |      |
| Total Split (%)         |      |      |      | 77.8% | 22.2% |      |
| Maximum Green (s)       |      |      |      | 63.8  | 13.7  |      |
| Yellow Time (s)         |      |      |      | 5.2   | 3.0   |      |
| All-Red Time (s)        |      |      |      | 1.0   | 3.3   |      |
| Lost Time Adjust (s)    |      |      |      | -1.2  | -1.3  |      |
| Total Lost Time (s)     |      |      |      | 5.0   | 5.0   |      |
| Lead/Lag                |      |      |      |       |       |      |
| Lead-Lag Optimize?      |      |      |      |       |       |      |
| Vehicle Extension (s)   |      |      |      | 6.0   | 2.0   |      |
| Minimum Gap (s)         |      |      |      | 3.4   | 0.2   |      |
| Time Before Reduce (s)  |      |      |      | 15.0  | 0.0   |      |
| Time To Reduce (s)      |      |      |      | 45.0  | 0.0   |      |
| Recall Mode             |      |      |      | C-Min | None  |      |
| Act Effct Green (s)     |      |      |      | 65.0  | 15.0  |      |
| Actuated g/C Ratio      |      |      |      | 0.72  | 0.17  |      |
| v/c Ratio               |      |      |      | 0.97  | 0.93  |      |
| Control Delay           |      |      |      | 24.1  | 62.1  |      |
| Queue Delay             |      |      |      | 0.0   | 0.0   |      |
| Total Delay             |      |      |      | 24.1  | 62.1  |      |
| LOS                     |      |      |      | C     | E     |      |
| Approach Delay          |      |      |      | 24.1  | 62.1  |      |
| Approach LOS            |      |      |      | C     | E     |      |



| Lane Group              | EBT | EBR | WBL | WBT  | NBL  | NBR |
|-------------------------|-----|-----|-----|------|------|-----|
| Queue Length 50th (ft)  |     |     |     | 567  | 155  |     |
| Queue Length 95th (ft)  |     |     |     | #886 | #252 |     |
| Internal Link Dist (ft) | 379 |     |     | 2432 | 346  |     |
| Turn Bay Length (ft)    |     |     |     |      |      |     |
| Base Capacity (vph)     |     |     |     | 2555 | 572  |     |
| Starvation Cap Reductn  |     |     |     | 0    | 0    |     |
| Spillback Cap Reductn   |     |     |     | 0    | 0    |     |
| Storage Cap Reductn     |     |     |     | 0    | 0    |     |
| Reduced v/c Ratio       |     |     |     | 0.97 | 0.93 |     |

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 30.9      Intersection LOS: C

Intersection Capacity Utilization 83.4%      ICU Level of Service E

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: U-Turn East & US 64 WB



| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 0.6  |      |      |      |      |      |
| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
| Lane Configurations      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 15   | 566  | 599  | 30   | 18   | 8    |
| Future Vol, veh/h        | 15   | 566  | 599  | 30   | 18   | 8    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | 100  | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 17   | 629  | 666  | 33   | 20   | 9    |

| Major/Minor          | Major1 | Major2 | Minor2 |   |             |
|----------------------|--------|--------|--------|---|-------------|
| Conflicting Flow All | 699    | 0      | -      | 0 | 1329 666    |
| Stage 1              | -      | -      | -      | - | 666 -       |
| Stage 2              | -      | -      | -      | - | 663 -       |
| Critical Hdwy        | 4.12   | -      | -      | - | 6.42 6.22   |
| Critical Hdwy Stg 1  | -      | -      | -      | - | 5.42 -      |
| Critical Hdwy Stg 2  | -      | -      | -      | - | 5.42 -      |
| Follow-up Hdwy       | 2.218  | -      | -      | - | 3.518 3.318 |
| Pot Cap-1 Maneuver   | 898    | -      | -      | - | 171 459     |
| Stage 1              | -      | -      | -      | - | 511 -       |
| Stage 2              | -      | -      | -      | - | 512 -       |
| Platoon blocked, %   |        | -      | -      | - |             |
| Mov Cap-1 Maneuver   | 898    | -      | -      | - | 168 459     |
| Mov Cap-2 Maneuver   | -      | -      | -      | - | 168 -       |
| Stage 1              | -      | -      | -      | - | 501 -       |
| Stage 2              | -      | -      | -      | - | 512 -       |

| Approach             | EB  | WB | SB |
|----------------------|-----|----|----|
| HCM Control Delay, s | 0.2 | 0  | 25 |
| HCM LOS              |     |    | D  |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 898   | -   | -   | -   | 209   |
| HCM Lane V/C Ratio    | 0.019 | -   | -   | -   | 0.138 |
| HCM Control Delay (s) | 9.1   | -   | -   | -   | 25    |
| HCM Lane LOS          | A     | -   | -   | -   | D     |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | -   | 0.5   |





[www.vhb.com](http://www.vhb.com)

# PLANNING BOARD REPORT TO TOWN COUNCIL

Rezoning Case: 20CZ14 Hackney PUD

Planning Board Meeting Date: March 8, 2021



## Report Requirements:

Per NCGS §160D-604(b), all proposed amendments to the zoning ordinance or zoning map shall be submitted to the Planning Board for review and comment. If no written report is received from the Planning Board within 30 days of referral of the amendment to the Planning Board, the Town Council may act on the amendment without the Planning Board report. The Town Council is not bound by the recommendations, if any, of the Planning Board.

Per NCGS §160D-604(d), the Planning Board shall advise and comment on whether the proposed action is consistent with all applicable officially adopted plans, and provide a written recommendation to the Town Council that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the officially adopted plans shall not preclude consideration or approval of the proposed amendment by the Town Council.

## PROJECT DESCRIPTION:

**Acreage:** ±79.79 acres

**PIN(s):** 0721492629, 0722406699, & 0722411102

**Current Zoning:** Rural Residential (RR) & R-80W

**Proposed Zoning:** Planned Unit Development-Conditional Zoning (PUD-CZ)

**2045 Land Use Map:** Medium Density Residential

**Town Limits:** ETJ and Outside (annexation of portion in Wake County is required with rezoning)

## Applicable Officially Adopted Plans:

The Board must state whether the project is consistent or inconsistent with the following officially adopted plans, if applicable. Applicable plans have a check mark next to them.

2045 Land Use Map  
 Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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Apex Transportation Plan  
 Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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Parks, Recreation, Open Space, and Greenways Plan  
 Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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# PLANNING BOARD REPORT TO TOWN COUNCIL

Rezoning Case: 20CZ14 Hackney PUD

Planning Board Meeting Date: March 8, 2021



## Legislative Considerations:

The applicant shall propose site-specific standards and conditions that take into account the following considerations, which are considerations that are relevant to the legislative determination of whether or not the proposed conditional zoning district rezoning request is in the public interest. These considerations do not exclude the legislative consideration of any other factor that is relevant to the public interest.

1. *Consistency with 2045 Land Use Plan.* The proposed Conditional Zoning (CZ) District use's appropriateness for its proposed location and consistency with the purposes, goals, objectives, and policies of the 2045 Land Use Plan.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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2. *Compatibility.* The proposed Conditional Zoning (CZ) District use's appropriateness for its proposed location and compatibility with the character of surrounding land uses.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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3. *Zoning district supplemental standards.* The proposed Conditional Zoning (CZ) District use's compliance with Sec. 4.4 *Supplemental Standards*, if applicable.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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4. *Design minimizes adverse impact.* The design of the proposed Conditional Zoning (CZ) District use's minimization of adverse effects, including visual impact of the proposed use on adjacent lands; and avoidance of significant adverse impacts on surrounding lands regarding trash, traffic, service delivery, parking and loading, odors, noise, glare, and vibration and not create a nuisance.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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5. *Design minimizes environmental impact.* The proposed Conditional Zoning District use's minimization of environmental impacts and protection from significant deterioration of water and air resources, wildlife habitat, scenic resources, and other natural resources.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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# PLANNING BOARD REPORT TO TOWN COUNCIL

Rezoning Case: 20CZ14 Hackney PUD

Planning Board Meeting Date: March 8, 2021



6. *Impact on public facilities.* The proposed Conditional Zoning (CZ) District use's avoidance of having adverse impacts on public facilities and services, including roads, potable water and wastewater facilities, parks, schools, police, fire and EMS facilities.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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7. *Health, safety, and welfare.* The proposed Conditional Zoning (CZ) District use's effect on the health, safety, or welfare of the residents of the Town or its ETJ.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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8. *Detrimental to adjacent properties.* Whether the proposed Conditional Zoning (CZ) District use is substantially detrimental to adjacent properties.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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9. *Not constitute nuisance or hazard.* Whether the proposed Conditional Zoning (CZ) District use constitutes a nuisance or hazard due to traffic impact or noise, or because of the number of persons who will be using the Conditional Zoning (CZ) District use.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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10. *Other relevant standards of this Ordinance.* Whether the proposed Conditional Zoning (CZ) District use complies with all standards imposed on it by all other applicable provisions of this Ordinance for use, layout, and general development characteristics.

Consistent                       Inconsistent                      Reason: \_\_\_\_\_

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PLANNING BOARD REPORT TO TOWN COUNCIL

Rezoning Case: 20CZ14 Hackney PUD

Planning Board Meeting Date: March 8, 2021



Planning Board Recommendation:

Motion: To recommend approval as presented.

Introduced by Planning Board member: Keith Braswell

Seconded by Planning Board member: Mark Steele

- Approval:* the project is consistent with all applicable officially adopted plans and the applicable legislative considerations listed above.
- Approval with conditions:* the project is not consistent with all applicable officially adopted plans and/or the applicable legislative considerations as noted above, so the following conditions are recommended to be included in the project in order to make it fully consistent:

Conditions proposed by the applicant.

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- Denial:* the project is not consistent with all applicable officially adopted plans and/or the applicable legislative considerations as noted above.

With 6 Planning Board Member(s) voting "aye"

With 0 Planning Board Member(s) voting "no"

Reasons for dissenting votes:

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This report reflects the recommendation of the Planning Board, this the 8th day of March 2021.

Attest:

**Michael Marks** Digitally signed by Michael Marks  
Date: 2021.03.09 14:50:15 -05'00'

Michael Marks, Planning Board Chair

**Dianne Khin** Digitally signed by Dianne Khin  
Date: 2021.03.08 17:59:54 -05'00'

Dianne Khin, Director of Planning and  
Community Development



**TOWN OF APEX**  
POST OFFICE BOX 250  
APEX, NORTH CAROLINA 27502  
PHONE 919-249-3426

**PUBLIC NOTIFICATION  
OF PUBLIC HEARINGS  
CONDITIONAL ZONING #20CZ14  
Hackney PUD**

Pursuant to the provisions of North Carolina General Statutes §160A-364 and to the Town of Apex Unified Development Ordinance (UDO) Section 2.2.11, notice is hereby given of public hearings before the Planning Board of the Town of Apex. The purpose of these hearings is to consider the following:

**Applicant:** WithersRavenel  
**Authorized Agent:** Brendie Vega, WithersRavenel  
**Property Addresses:** 0, 2500, & 2600 Olive Chapel Road  
**Acreage:** ±79.79 acres  
**Property Identification Numbers (PINs):** 0721492629, 0722406699, & 0722411102  
**2045 Land Use Map Designation:** Medium Density Residential  
**Existing Zoning of Properties:** Rural Residential (RR) & R-80W  
**Proposed Zoning of Properties:** Planned Unit Development-Conditional Zoning (PUD-CZ)

**Public Hearing Location:** Apex Town Hall  
Council Chambers, 2<sup>nd</sup> Floor  
73 Hunter Street, Apex, North Carolina

**Planning Board Public Hearing Date and Time: March 8, 2021 4:30 PM**

If you would like to speak during the public hearing, you may sign-in ahead of time by emailing your name and address to [bonnie.brock@apexnc.org](mailto:bonnie.brock@apexnc.org). You may attend the meeting in person or view the meeting through the Town's YouTube livestream at: <https://www.youtube.com/c/townofapexgov>.

If you are unable to attend, you may provide comments no later than noon on Friday, March 5, 2021 by email ([public.hearing@apexnc.org](mailto:public.hearing@apexnc.org), 350-word limit) or voicemail (919-362-7300, 3-minute limit) according to the Remote Participation Policy at: <http://www.apexnc.org/DocumentCenter/View/31397/>. You must provide your name and address for the record. These comments will be read during the Planning Board meeting.

A separate notice of the Town Council public hearing on this project will be mailed and posted in order to comply with State public notice requirements.

**Vicinity Map:**



Property owners within 300 feet of the proposed conditional zoning have been sent this notice via first class mail. All interested parties may submit comments with respect to the application by the means specified above. In addition to the above map, the location of the property may be viewed online at <https://maps.raleighnc.gov/imag>. The 2045 Land Use Map may be viewed online at [www.apexnc.org/DocumentCenter/View/478](http://www.apexnc.org/DocumentCenter/View/478). You may call 919-249-3426, Department of Planning and Community Development, with questions or for further information. To view the petition and related documents on-line: <https://www.apexnc.org/DocumentCenter/View/33875>.

Dianne F. Khin, AICP  
Director of Planning and Community Development

Published 1 / 1





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**Property Addresses:** 0, 2500, & 2600 Olive Chapel Road  
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73 Hunter Street, Apex, North Carolina

*Comments received prior to or during the Planning Board public hearing will not be read during the Town Council public hearing. Separate comments must be provided for the two public hearings in the time frames specified below.*

**Town Council Public Hearing Date and Time: March 23, 2021 6:00 PM**

You may attend the meeting in person or view the meeting through the Town's YouTube livestream at: <https://www.youtube.com/c/townofapexgov>.

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Dianne F. Khin, AICP  
Director of Planning and Community Development

Published Dates: February 26-March 23, 2021







TOWN OF APEX  
POST OFFICE BOX 250  
APEX, NORTH CAROLINA 27502  
PHONE 919-249-3426

REVISED PUBLIC NOTIFICATION  
OF PUBLIC HEARINGS  
CONDITIONAL ZONING #20CZ14  
Hackney PUD

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Public Hearing Location: **Apex Town Hall  
Council Chambers, 3<sup>rd</sup> Floor  
22 Hunter Street, Apex, North Carolina**

Comments received prior to or during the Planning Board public hearing will not be read during the Town Council public hearing. Separate comments must be provided for the two public hearings in the time frames specified below.

**Town Council Remote Public Hearing Date and Time: March 23, 2021 6:00 PM**

You may ~~attend the meeting in person~~ or view the meeting through the Town's YouTube livestream at: <https://www.youtube.com/c/townofapexgov>.

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Dianne F. Khin, AICP  
Director of Planning and Community Development

Published Dates: ~~February 26~~ March 16-March 23, 2021







# TOWN OF APEX

POST OFFICE BOX 250  
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## PUBLIC NOTIFICATION OF PUBLIC HEARINGS CONDITIONAL ZONING #20CZ14 Hackney PUD

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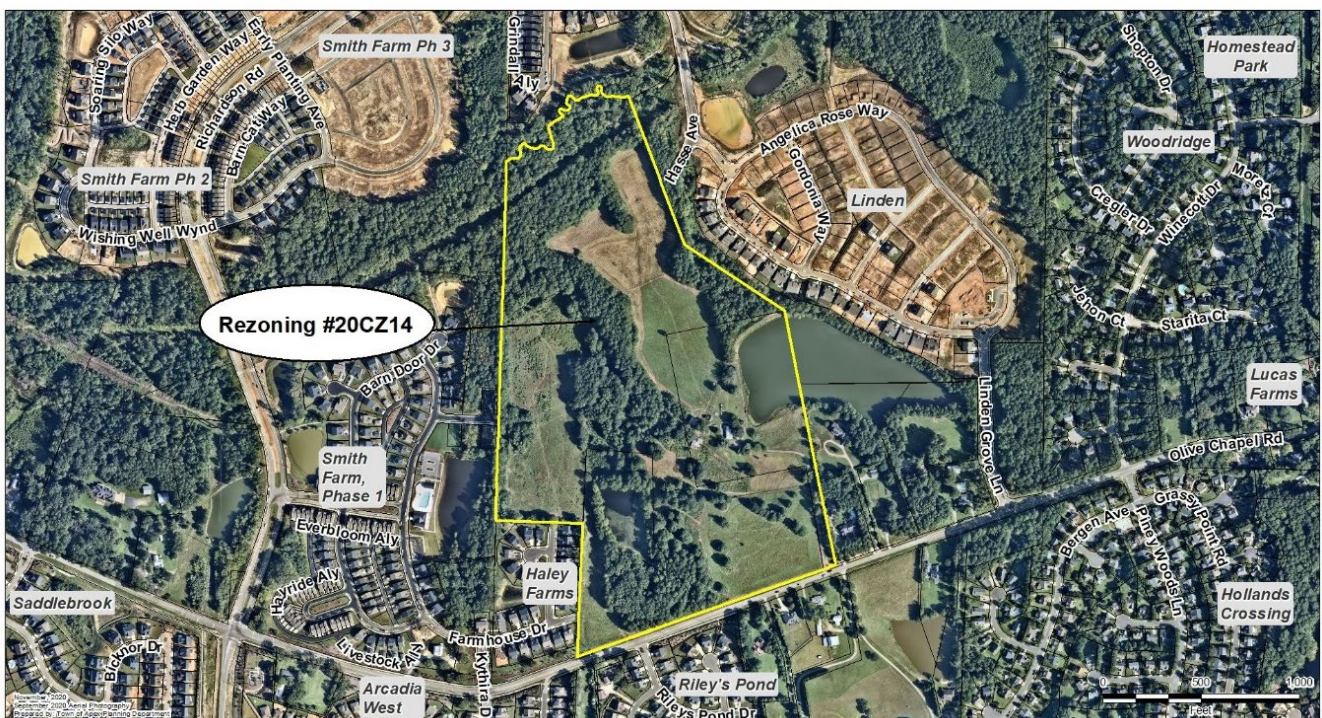
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# TOWN OF APEX

POST OFFICE BOX 250  
APEX, NORTH CAROLINA 27502  
PHONE 919-249-3426

## REVISED PUBLIC NOTIFICATION OF PUBLIC HEARINGS

CONDITIONAL ZONING #20CZ14  
Hackney PUD

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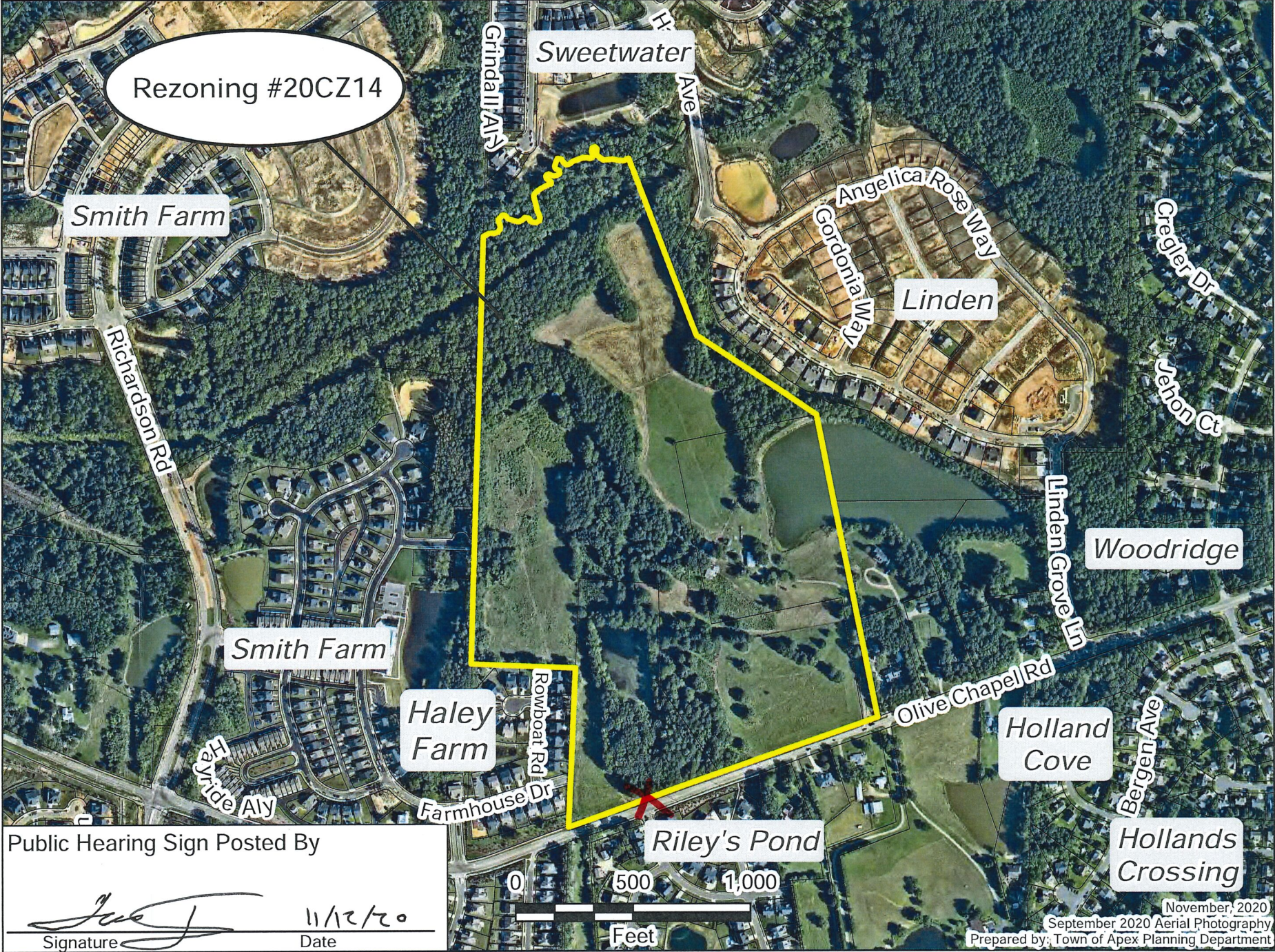
**Vicinity Map:**



Property owners within 300 feet of the proposed conditional zoning have been sent this notice via first class mail. All interested parties may submit comments with respect to the application by the means specified above. In addition to the above map, the location of the property may be viewed online at <https://maps.raleighnc.gov/imaps>. The 2045 Land Use Map may be viewed online at [www.apexnc.org/DocumentCenter/View/478](http://www.apexnc.org/DocumentCenter/View/478). You may call 919-249-3426, Department of Planning and Community Development, with questions or for further information. To view the petition and related documents on-line: <https://www.apexnc.org/DocumentCenter/View/33875>.

Dianne F. Khin, AICP  
Director of Planning and Community Development





Rezoning #20CZ14

Smith Farm

Sweetwater

Angelica Rose Way  
Gordonia Way  
Linden

Cregler Dr  
Landon Ct

Richardson Rd

Smith Farm

Woodridge

Haley Farm

Holland Cove

Hayride Aly

Rowboat Rd  
Farmhouse Dr

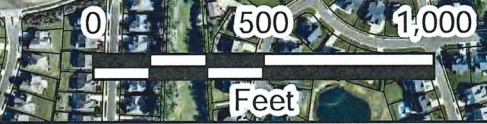
Olive Chapel Rd

Bergen Ave

Riley's Pond

Hollands Crossing

Public Hearing Sign Posted By  
*[Signature]*  
Signature  
Date 11/12/20



November, 2020  
September 2020 Aerial Photography  
Prepared by: Town of Apex Planning Department





**TOWN OF APEX**

POST OFFICE BOX 250  
APEX, NORTH CAROLINA 27502  
PHONE 919-249-3426

**AFFIDAVIT CERTIFYING  
Public Notification – Written (Mailed) Notice**

Section 2.2.11

Town of Apex Unified Development Ordinance

Project Name: Conditional Zoning #20CZ14  
Hackney PUD  
Project Location: 0, 2500, & 2600 Olive Chapel Road  
Applicant or Authorized Agent: Brendie Vega, WithersRavenel  
Firm: WithersRavenel

This is to certify that I, as Director of Planning and Community Development, mailed or caused to have mailed by first class postage for the above mentioned project on February 26, 2021, a notice containing the time and place, location, nature and scope of the application, where additional information may be obtained, and the opportunity for interested parties to be heard, to the property owners within 300' of the land subject to notification. I further certify that I relied on information provided to me by the above-mentioned person as to accuracy and mailing addresses of property owners within 300' of the land subject to notification.

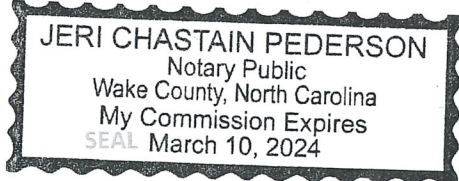
2-26-2021  
Date

Liz Loflin for Dianne Khin  
Director of Planning & Community Development

STATE OF NORTH CAROLINA  
COUNTY OF WAKE

Sworn and subscribed before me, Jeri Chastain Pederson, a Notary Public for the above

State and County, this the 26 day of February, 2021.



Jeri Chastain Pederson  
Notary Public

My Commission Expires: 3 / 10 / 2024



**TOWN OF APEX**  
 POST OFFICE BOX 250  
 APEX, NORTH CAROLINA 27502  
 PHONE 919-249-3426

**AFFIDAVIT CERTIFYING  
 Public Notification – Written (Mailed) Notice**

Section 2.2.11  
 Town of Apex Unified Development Ordinance

Project Name: Conditional Zoning #20CZ14  
 Hackney PUD  
 Project Location: 0, 2500, & 2600 Olive Chapel Road  
 Applicant or Authorized Agent: Brendie Vega, WithersRavenel  
 Firm: WithersRavenel

This is to certify that I, as Director of Planning and Community Development, mailed or caused to have mailed by first class postage for the above mentioned project on February 23, 2021, a notice containing the time and place, location, nature and scope of the application, where additional information may be obtained, and the opportunity for interested parties to be heard, to the property owners within 300' of the land subject to notification. I further certify that I relied on information provided to me by the above-mentioned person as to accuracy and mailing addresses of property owners within 300' of the land subject to notification.

2-23-2021

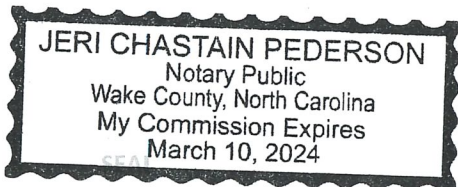
Date

Diz Koltin for Dianne Khin  
 Director of Planning & Community Development

STATE OF NORTH CAROLINA  
 COUNTY OF WAKE

Sworn and subscribed before me, Jeri Chastain Pederson, a Notary Public for the above

State and County, this the 23 day of February, 2021.



Jeri Chastain Pederson  
 Notary Public

My Commission Expires: 3 / 10 / 2024



**Student Assignment**

**Glenn Carrozza**  
5625 Dillard Drive  
Cary, NC 27518

tel: (919) 431-7333  
fax: (919) 694-7753

February 17, 2021

Dianne Khin, AICP  
Director, Department of Planning and Community Development  
Town of Apex  
[Dianne.Khin@apexnc.org](mailto:Dianne.Khin@apexnc.org)

Dear Dianne,

The Wake County Public School System (WCPSS) Office of School Assignment received information about a proposed rezoning/development within the Town of Apex planning area. We are providing this letter to share information about WCPSS's capacity related to the proposal. The following information about the proposed rezoning/development was provided through the Wake County Residential Development Notification database:

- Date of application: November 2, 2020
- Name of development: 20CZ14 Hackney Tracts PUD
- Address of rezoning/development: 0, 2500, & 2600 Olive Chapel Rd
- Total number of proposed residential units: 319
- Type(s) of residential units proposed: Single-family; townhouse; townhouse, detached; accessory apartment

Based on the information received at the time of application, the Office of School Assignment is providing the following assessment of possible impacts to the Wake County Public School System:

- Schools at all grade levels within the current assignment area for the proposed rezoning/development are anticipated to have sufficient capacity for future students.
- Schools at the following grade levels within the current assignment area for the proposed rezoning/development are anticipated to have insufficient capacity for future students; transportation to schools outside of the current assignment area should be anticipated:

Elementary                       Middle                       High

The following mitigation of capacity concerns due to school construction or expansion is anticipated:

- Not applicable – existing school capacity is anticipated to be sufficient.
- School expansion or construction within the next five years is not anticipated to address concerns.
- School expansion or construction within the next five years may address concerns at these grade levels:

Elementary                       Middle                       High

Thank you for sharing this information with the Town of Apex Planning Board and Town Council as they consider the proposed rezoning/development.

Sincerely,

Glenn Carrozza